

BLM LIBRARY



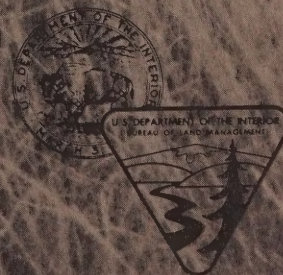
88081703

FORT UNION COAL

BURNS CREEK TRACT

SEPTEMBER 1981

TD
195
.C58
B876
1981



7910741

ID: 88081703

TD
195
.C58
B876
1981

FORT UNION COAL REGION

BURNS CREEK TRACT ANALYSIS

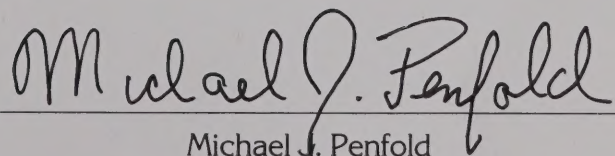
SITE SPECIFIC ANALYSIS

PRELIMINARY FACILITY EVALUATION REPORT

DAWSON COUNTY, MONTANA

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

September 1981



Michael J. Penfold
State Director

PREFACE

This document contains a site-specific analysis and a preliminary facility evaluation report. The site-specific analysis discusses the consequences of leasing and mining a particular tract. The preliminary facility evaluation report discusses significant issues associated with an end use coal conversion facility.

There were 24 tracts identified through a screening process under the over-all direction of the Fort Union Region Coal Team. The team consists of federal, state, and local officials. The tracts are being evaluated for potential federal coal leasing for a coal lease sale scheduled for June 1983. The evaluation, called a site-specific analysis, has been completed for each of the 24 tracts.

Historically, development of a new coal mine in the Fort Union Coal Region has been associated with a coal conversion facility power plant in the vicinity of the mine. For this reason, the Regional Coal Team directed BLM to evaluate impacts of a typical facility near each potential mine. A preliminary facility evaluation report was prepared for each facility.

The Fort Union Regional Coal Team will begin ranking and grouping selected tracts into alternative leasing patterns for the 1983 lease sale using information from these individual reports. These groupings of tracts will form the basis for alternatives and a regional environmental impact statement to be developed during 1982. The analysis in this report represents an important step in a lengthy process which takes place prior to any final decision on federal coal leasing within the region.

Of the 24 tracts currently being evaluated, 16 would require the opening of new mines. One of the 16 would be specifically earmarked for small business. The remaining eight tracts constitute coal which would be needed to maintain production or prevent the by-pass of federal coal at an ongoing mining operation.

Approximately 1.6 billion tons of recoverable federal coal lie within the areas being evaluated. Final designation of some areas as unsuitable for mining under the 1977 Surface Mining Control and Reclamation Act will likely reduce the amount of federal coal actually available for leasing and development, and could remove several of the 24 tracts from further consideration. This information will not be available until early 1982.

A major purpose of the site-specific analysis and preliminary facility evaluation reports is to acquaint the public with key issues and consequences of leasing and development of federal coal reserves so that they may (1) offer comments to the Fort Union Regional Coal Team on what areas they consider most important to be evaluated and analyzed in the ranking of the tracts and in the Regional EIS and (2) offer specific advice on what decision alternatives the Coal Team should look at more closely.

CONTENTS

Site Specific Analysis

Introduction	1
Chapter I — Alternatives	5
Chapter II — Affected Environment	7
Chapter III — Environmental Consequences	17
References	29
Summary Matrix	31
Unsuitability Criteria Results	37

Preliminary Facility Evaluation Report

Goals and Objectives	41
Part One — Assumptions and Variables	41
Part Two — Relationship of Tract and Facility	47

SITE SPECIFIC ANALYSIS

INTRODUCTION

The purpose of this action is to offer strippable federal coal reserves that can be further considered for coal leasing and development to help meet the energy needs of the Nation.

This site specific environmental analysis has been prepared for the Burns Creek tract (see Map 1) in accordance with federal regulations (43 CFR 3420). It will be used by the Fort Union Regional Coal Team to further consider competitive leasing of federal coal within the tract for a June 30, 1983, coal lease sale schedule. If selected and leased, the Burns Creek tract will contribute 31.0 million tons of federal coal to the regional leasing target. Presently, a regional leasing target has not been established by the Secretary of the Interior. The preliminary regional leasing target will be established in August 1981 and finalized in October 1981.

BACKGROUND

In September of 1979, the Miles City District BLM Office completed the Redwater Management Framework Plan (MFP) for Dawson, McCone, Richland and Wibaux counties. The land use planning process included applying unsuitability criteria as much as possible, multiple-use conflict evaluation, and surface owner consultations. As a result of that work, areas were identified that could be further considered for coal development. The areas are available for consideration for new competitive leasing, leasing by exchanging and modifying existing leases (see Map 1).

Following land-use planning, the BLM requested expressions of leasing interest which, along with other information, guided the USGS in delineating this tract. Results of that work are summarized in this profile.

Personnel from BLM's Miles City District inventoried the tract to determine the site specific resource values and then analyzed potential environmental effects of coal development on this individual tract. Among other items, the unsuitability criteria (43 CFR 3461) were reconsidered on this site-specific basis. Any new findings of unsuitability are reflected in this report.

To be further considered for new competitive leasing, the tract will be presented to the Regional Coal Team who will rank and select tracts for a proposed lease sale schedule. The proposed lease sale tracts are then analyzed in a regional environmental impact statement (EIS). The EIS will analyze the site-specific and regional cumulative effects of coal leasing and development. Alternatives addressed in the EIS will include different combinations of tracts that meet a regional coal leasing target. The analysis of those groups of tracts could result in different impacts than the assessment made in this document for this specific tract. During the process this preliminary tract could be modified. Ultimately, the

Secretary will select specific tracts for lease sale. If the tract is leased, the lessee will be required to submit a plan for mining and reclamation to the Secretary of the Interior, Office of Surface Mining (OSM) for review and approval within three years after leasing. Once a mining plan has been submitted, OSM will review the proposed developments of the mining plan. OSM will prepare a site-specific environmental assessment or EIS prior to approval of the mining plan.

Development of the tract is in accordance with the federal coal management program adopted by the Secretary of the Interior in June 1979. Basis of the program was, in part, the Final Environmental Statement for the Federal Coal Management Program. Implementation procedures are contained in Title 43—Code of Federal Regulations—Part 3400 (43 CFR 3400). Authorizing actions are the Mineral Leasing Act of 1920, as amended; the Mineral Leasing Act for Acquired Lands of 1947, as amended; the Federal Land Policy and Management Act of 1976; the Surface Mining Control and Reclamation Act of 1977; the Multiple Mineral Development Act of 1954; the Department of Energy Organization Act of 1977; the National Environmental Policy Act of 1969; the Federal Coal Leasing Amendments Act of 1976; as amended; and federal regulations concerning federal coal leasing and development including 43 CFR 3400; 30 CFR 211; and 30 CFR 700-899.

TRACT DELINEATION REPORT SUMMARY

The Burns Creek tract is located in the Great Plains physiographic province and lies approximately 18 miles southwest of Savage, in Dawson County, Montana. The tract contains one economical recoverable seam (the Pust bed) of lignite coal.

The seam averages 35 feet in thickness, with overburden averaging 118 feet. There are no known geological hazards to surface mining in the Burns Creek tract.

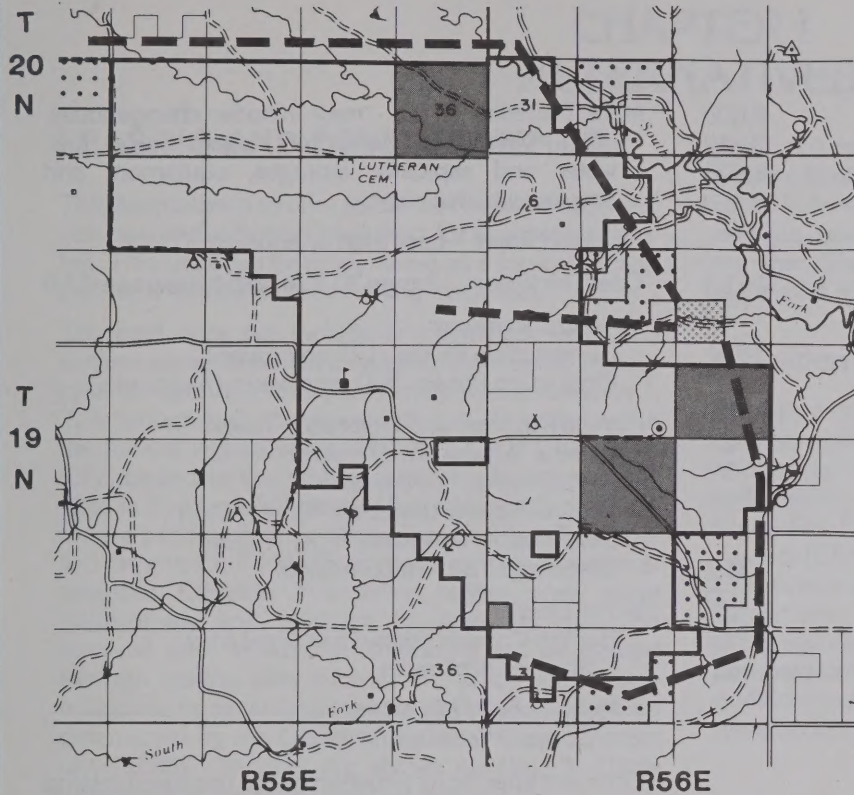
The generic mining plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers and other support equipment. A possible mining sequence for analysis purposes is shown on Map 2. The plan indicates the most probable use of the coal would be an on-site synthetic fuel plant.

Specific Tract Characteristics:

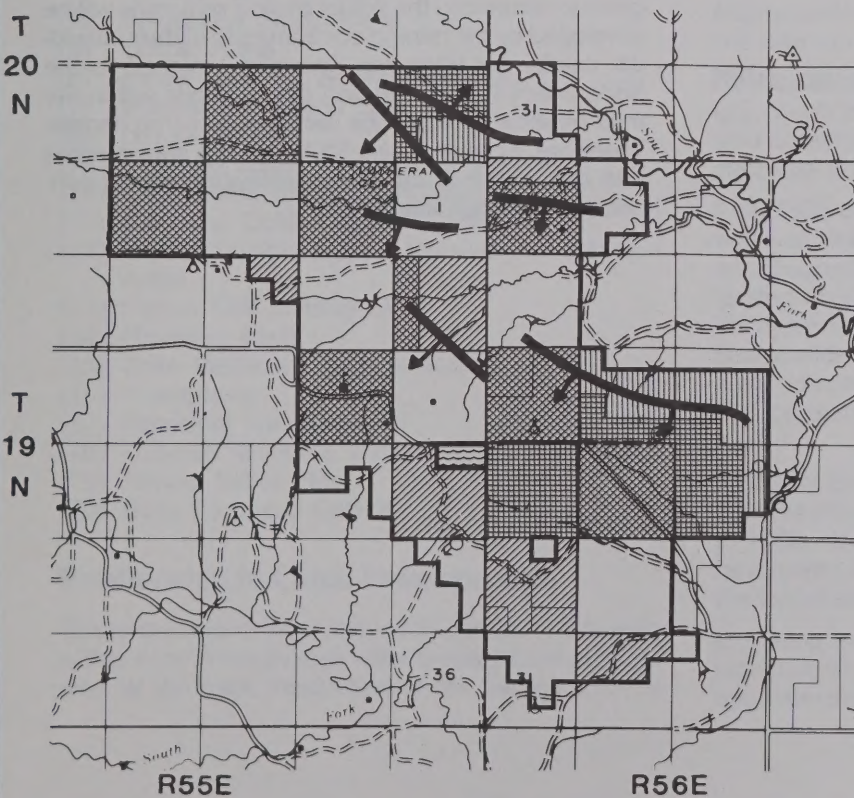
Acreage:

Surface:	Federal	37
	State	1,741
	Private	14,552
	Total:	16,330

BURNS CREEK TRACT



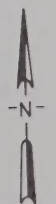
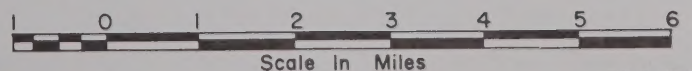
SURFACE



SUBSURFACE

LEGEND

-  Federal Surface
-  State Surface
-  Private Surface
-  Surface Owner Nonconsents
-  Tract Boundary
-  Federal Coal
-  State Coal
-  Private Coal
-  Federal Coal Lease
-  State Coal Lease
-  Bypass
-  Surface Facilities
-  Out-of-Pit Haul Roads
-  Pit Advancement



SITE SPECIFIC ANALYSIS

Coal:	Federal	6,608
	State	2,849
	Private	6,873
	Total	16,330

Coal Reserves/Millions of Tons:

In Place:	Federal	287.3
	State	113.4
	Private	175.2
	Total	535.8

Recoverable:	Federal	258.5
	State	102.1
	Private	175.2
	Total:	535.8

Currently Leased Recoverable:	Federal	31.1
	State	11.2
	Total	42.3

Coal Quality: Average of samples as received from vicinity of tract:

Moisture	36.2%
Ash	11.4%
Volatile matter	27.5%
Sulfur	0.7%*
Fixed carbon	28.6%
BTU's/lb	6,750

*Contained microveins of pyrite

Surface Disturbance/acres

Mining: Annual rate, 250; Total Life of Mine, 10,033

Haul Roads: 210

Mine Facilities: 160 - may include: changehouse, office warehouse, equipment repair shops, fuel, water and explosive storages, equipment and employee parking lots.

Stripping Ratio: Less than or equal to 20 to 1

Coal Thickness: Range 30 ft. to 36.5 ft.; average, 33.9

Mine Employment:

Construction Phase - 175 employees

Production Phase - 500 employees (maximum)

Annual Royalties and Severance Taxes:

Federal Royalty, \$0.99 million

State Royalty, \$1.70 million

Federal Royalty Unleased, \$0.99 million

State Royalty Unleased, \$0.21 million

Severance Tax, \$16.08 million.

Water Needs:

Human Consumption, 15,000 gal./day

Source: Well water

Nonpotable, 120,000 gal./day

Source: Yellowstone River

For more specific information on the proposed mining operation, refer to the Engineering, Geologic and Land Reports prepared by the USGS Tract Delineation Team.

NOTE: As the mine plans developed by USGS are of a generic nature and the actual mining sequence will be developed by the mining companies to fit their individual needs, the Resource Specialist assigned to the SSAs made the assumption that all lands within the tract boundaries would be disturbed to some degree. Therefore, acreage in the SSA may not always agree with that shown in the Tract Delineation Report concerning acreage disturbance.

CHAPTER I

ALTERNATIVES

LEASING AND DEVELOPMENT

This alternative is to offer for further consideration federal coal in the Burns Creek tract for competitive leasing. This tract has been identified as a logical mining unit for a 40-year surface mining operation.

The tract does not include any lands for which the surface owner has filed a valid nonconsent to mining prior to March 1, 1981. Unsuitability criteria numbers 1, 2, 4 through 6, 8; 16 through 18, and 20, as defined in the federal regulations CFR Subpart 3461 has been fully applied to the private surface over federal coal. Criteria numbers 9 through 15 involving fish and wildlife are pending further study. This criteria will be applied prior to the Final EIS as the information becomes available. Criterion 3 involving buffer zones along rights-of-way and adjacent to dwellings must be resolved prior to mining. Criterion 7 will be cleared through mining plan submission, which will include mitigation or avoidance measures. Criterion 19 will be determined by the Office of Surface Mining. Current unsuitability concerns are shown on Map 3. These unsuitability criteria are listed as follows:

- (1) Federal Land System
- (2) Rights-of-Way and Easements
- (3) Buffer Zones along R/W and Adjacent to Communities and Buildings
- (4) Wilderness Study Areas
- (5) Scenic Areas
- (6) Lands Used for Scientific Studies
- (7) Historic Lands and Sites
- (8) Natural Areas
- (9) Federally Listed Endangered Species
- (10) State Listed Endangered Species
- (11) Bald and Golden Eagle Nests
- (12) Bald and Golden Eagle Roost and Concentration Areas
- (13) Falcon Cliff Nesting Sites
- (14) Migratory Birds
- (15) State Resident Fish and Wildlife
- (16) Floodplains
- (17) Municipal Watersheds
- (18) National Resource Waters
- (19) Alluvial Valley Floors
- (20) State Proposed Criteria

Relationship to Other Developments

The tract contains one small inactive mine. The nearest active mine is the Savage mine located 6 miles northwest of the tract. Production of the Savage mine is

about 0.3 million tons annually. The tract lies on the western flank of the Williston Basin oil and gas field. All of the federal lands within the tracts are subjected to oil and gas leases. No active leases or wells are located in the tract. Farming and ranching are the only other significant activities in or near the tract.

Mitigation Measures

This alternative assumes that proper mining and reclamation will be carried out according to existing state and federal regulations. These include: Office of Surface Mining Reclamation and Enforcement regulations (30 CFR 700-899), Environmental Protection Agency (EPA) regulations (40 CFR 0-1399), Council of Environmental Quality regulations (40 CFR 211), Department of the Interior's Coal Management Program regulations (43 CFR 23 and 3400), and regulations of the Montana Department of State Lands. No additional mitigation under the authority of the Federal government has been identified.

NO LEASING ALTERNATIVE

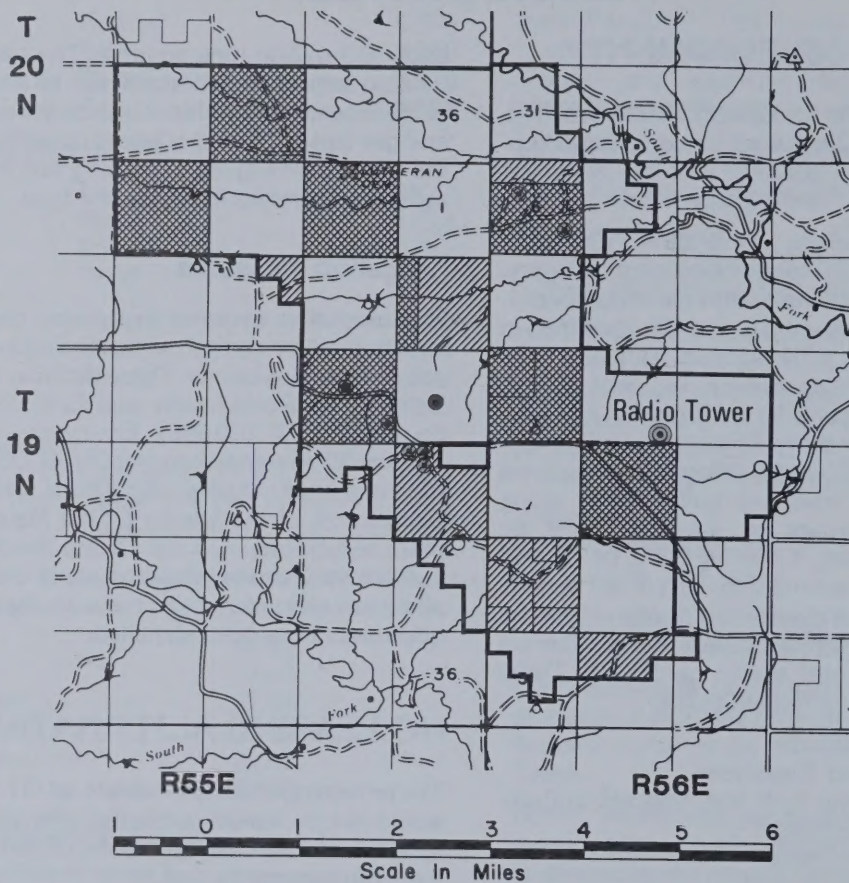
The remaining unleased federal coal (31.1 million tons) would not be leased under this alternative. Unleased federal and state coal represents 5.8 and 2.1 percent of the total recoverable coal.

About 228 million tons of federal coal was leased to the U.S. Steel Corporation in December of 1967. U.S. Steel also obtained 20-year leases for 90.9 million tons of state coal in October 1967.

The USGS tract delineation report states "Existing federal coal leases coupled with the state and private coal would support one mine in this area. Additional federal leasing would increase the mine reserves and prevent the bypassing of federal coal." The U.S. Steel Corporation provided an Expression of Leasing Interest for the area, however, time frames were not specified. Mobile Oil Corporation is conducting wildlife inventories on the tract.

If diligent development requirements are met, development of the existing federal leases would begin prior to 1986, otherwise advanced royalty payments would be required. Provisions for a 20-year extension exists for the leased state coal.

If mining begins by 1986, environmental impacts would be similar to those described in Chapter III over approximately 92 percent of the tract.



BURNS CREEK TRACT

LEGEND

Areas that may be declared unsuitable for surface mining based on existing information.

- By BLM
- By Others

- Federal Coal
- Leased Federal Coal
- Potential Dwellings

CHAPTER II

AFFECTED ENVIRONMENT

This section is a description of the current environment with anticipated changes from ongoing trends. Within the Williston Basin there has been an increase in oil and gas exploration and this trend is expected to continue. The physical resources described in this section represent only existing conditions while the social and economic sections account for existing conditions and ongoing trends. It is recognized that the physical resource values may change due to future oil and gas exploration.

TOPOGRAPHY

Surface expression consists of a series of flat-topped, gently sloping ridges, alternating with eastward flowing drainages (see Figure 1). The heads of the drainages often exhibit steep slopes (see Figure 2). Elevations within the tract vary from 2310 to 2745 feet.

GEOLOGY

The area is underlain by sandstone, shale, and lignite beds belonging to the Tongue River Member of the Fort Union Formation (Paleocene). Most of the ridge crests are capped by a veneer of Flaxville Gravel (Miocene/Pliocene).

Limited data exist on a 5 foot coal seam 80 to 90 feet below the Pust bed. However, the Pust bed is considered the only economical coal bed in the tract. Although no discoveries of other minerals have been made within the tract, the area is underlain by formations that are prospectively valuable for oil and gas. No other mineral values are known to occur within the tract.

SOILS AND RECLAMATION POTENTIAL

Soils within the tract are formed in weakly consolidated sandstone, alluvium and glacial till. The soils occur along steep, dissected sedimentary plains, undulating and hilly sedimentary plains and nearly level to rolling high terraces on uplands. Profile development and depths vary due to climate, parent material and geomorphic stability.

There are 26 soil series in the tract surveyed by the Soil Conservation Service at level two. The soils found in the tract are further discussed in Table 1.

HYDROLOGY

Surface Water

The proposed tract is drained mainly by tributaries to the South Fork Burns Creek which crosses the northeast corner of the unit. A few small tributaries along the southeast side of the tract flow southwest to Thirteen Mile Creek. Burns Creek joins the Yellowstone River at Burns, about 12 miles southeast of its intersection with the tract (Map 2). Burns Creek and its tributaries have only intermittent flow, mainly in response to summer thunderstorms and from snowmelt in February through April. Burns Creek has had flow about 295 days per year in the 14 years of record. The smaller tributaries are estimated to have flow less than 30 days per year. The estimated annual yield from the reach of the South Fork Burns Creek upstream of the tract is 915 acre feet (AF) per year, and the peak flow anticipated at least once in 10 years is 720 cubic feet per second (cfs). The principal tributary to South Fork Burns Creek, draining about 22 square miles in the northern part of the tract, has an estimated annual yield of 410 AF/yr and an estimated 10-year peak flow of 490 cfs. A smaller tributary that drains 7 square miles in the central part of the tract has an estimated annual yield of 130 AF and an estimated 10-year peak flow of 300 cfs. The flows have not been sampled for chemical quality, but during low flows and estimating from the surrounding area, the dissolved solids concentration are probably in the range of 1,000 to 3,000 milligrams per liter (mg/l) and sodium, sulfate, and bicarbonate probably are the dominant ions. During high flow, the dissolved solids concentration would be about 200 to 600 mg/l and the water a calcium bicarbonate type. The water is used for stock and wildlife water and also contributes to the flows of the Yellowstone and Missouri Rivers.

Groundwater

The principal aquifers in the tract are the near-surface alluvium, Tongue River, and lower Fort Union. At greater depth is the Fox Hills-lower Hell Creek aquifer. Groundwater in the near-surface aquifers flows south-eastward toward the Yellowstone River and groundwater contained in the deeper aquifer flows northeastward in the direction of dip of the aquifer. Only the alluvium and the Tongue River are developed by wells inventoried in or near the tract. Ground water in the alluvium is unconfined, and semi-confined to the Fort Union.

Water levels in inventoried wells range from 14 to 256 feet below the surface, yields range from 2 to 25 gallons



Figure 1. A number of flat-topped, gently sloping ridges cover this tract.



Figure 2. One of the drainages within the tract.

TABLE 1
BURNS CREEK
SOIL EROSION

SOIL MAPPING UNIT NAME	DEPTH ^{1/}				SOIL EROSION ^{1/} POTENTIAL		SURFACE ACRES	PERCENT OF AREA	SOIL ^{2/} RECONSRT. POTENTIAL	SOIL ^{2/} HAZARD CONDITIONS	SUITABILITY OF SOIL MATERIAL ^{3/} FOR GROWTH (ACRE FEET)		
	SHALLOW	MODERATELY	DEEP	PERCENT	WIND	WATER					GOOD	FAIR	POOR
	0-20"	DEEP	DEEP	SLOPE									
	20-36"	36+"											
Beaverton complex:Turner- Beaverton loams			X	4-15	Low	High	1721	11	Poor	Too sandy, droughty	293	2902	5410
Cherry silty clayloam, Farnuf loam			X	0-4	Low	Low	40	1	Fair	Excess lime, too clayey	15	185	--
Cherry silty clayloam, Farnuf loam			X	2-8	Low	Mod.	702	5	Fair	Excess lime, too clayey	45	3465	--
Cherry-Lambert complex, Lambert gravelly loam			X	4-40	Low	High	941	6	Fair	Excess lime	--	4705	--
Cherry, Havreton and Trembles Soils, occasionally flooded			X	--	Mod	High	1034	6	Fair	Excess lime	--	5170	--
Farnuf-Shambo loams, Lambert Silt loam, Shambo loam, Shambo-Lambert complex			X	2-8	Low	Mod	1230	7	Fair	Excess lime	780	5370	--
Dawson County Soil Survey Report and SCS Soil Series Descriptions and Interpr													
Lambert silt loam, Shambo- Lambert complex			X	8-15	Low	High	649	4	Fair	Excess lime	226	2991	15
Lambert-Badland complex	X(.40)		X(.60)	20-80+	Mod	High	362	2	Poor	Excess lime, slope	--	1021	40
Lambert-Dimyaw complex			X	15-65	Low	High	606	4	Poor	Excess lime, too clayey	--	1739	1157
Lambert-Ringling complex	X(.40)		X(.60)	15-65	Low	High	1570	10	Fair	Excess lime	63	4961	251
Lihen loamy sand			X	4-20	High	Mod.	60	<1	Fair	Too sandy	--	300	--
Shambo Loam			X	0-2	Low	Low	26	<1	Fair	Excess lime	30	100	--
Tally fine sandy loam			X	0-4	High	Mod.	81	1	Fair	Droughty	203	203	---
Tc Tally fine sandy loam			X	4-15	High	High	410	3	Fair	Droughty	1025	1025	---
Tinsley-Lambert complex			X	15-65	High	Mod.	777	1	Poor	Excess lime, droughty	8	1624	2253
Tinsley soils			X	15-65	High	Low	174	1	Poor	Too sandy, droughty	--	57	813
Turner fine sandy loam			X	1-4	High	Mod.	815	5	Poor	Excess lime, too sandy	334	1565	2176
Turner-Beaverton loams			X	0-2	Low	Low	344	2	Poor	Too sandy, droughty	110	660	949
Turner-Beaverton loams			X	2-4	Low	Mod.	1169	7	Poor	Too sandy, droughty	374	2244	3226
Tinsley-Lambert Complex			X	15-65	High	Mod.	4874	30	Poor	Excess lime, droughty	49	10187	14135
Vida Clay loam, gently undulating			X	---	Low	Low	13	<1	Poor	Excess lime, too clayey	--	24	41
TOTALS													
Soil Depths	Soil Erosion Potential				Soil Reconstruction Potential				Suitability of Soil Material for Plant Growth				
Shallow - 5%	Wind	Water						Good - 3%					
	Low - 56%	Low - 3%		Fair - 38%				Fair - 58%					
Deep - 95%	Mod. - 8%	Mod. - 54%		Poor - 62%				Poor - 35%					
	High -36%	High - 43%						Unsuitable - 4%					

^{1/} Soil Depth Classification and Soil Erosion Potential is derived from Dawson County Soil Survey Report and SCS Soil Series Descriptions and Interpretations. ^{3/} Depth (in acrefeet) of available soil calculated from acres x acrefeet/acre = suitability of soil material for plant growth.

^{2/} Soil Reconstruction Potential is derived from the National Soils Handbook.

per minute (gpm), and the wells are 34 to 285 feet deep. The dissolved solids contained in groundwater from sampled wells ranges from 700 to 2,500 mg/l and the water is a sodium sulfate type. At least 11 stock wells and two domestic wells are within the boundaries of the tract. Outside of the tract, but within one mile of the boundary, are at least six stock wells and five domestic wells.

LAND USES

Vegetation and Agricultural Production

Agricultural operations in this area consist of: (1) livestock and (2) small grains and livestock (see Table 2). Most of the cropland in this area is dryland farming with small areas being irrigated. A crop-fallow system is used in the dryland farmed area with mainly wheat or barley being grown. Small acreages are used for other small grains, forage crops, potatoes, flax or pasture.

There are 11 agricultural operators who have part of their operations within the tract. However, six agricultural operators have no cropland within the tract (see Table 3). Only 17.6 percent of the total cropland of these 11 operators lies within the tract. This pattern varies greatly by operator. For example, the largest operator has 8,091 total acres (3,123 acres of cropland) with only 4,225 acres (728 acres of cropland) or 52.2 percent of the operation in the tract while the smallest operator has 1,180 acres (220 acres of cropland) with only 622 acres (69 acres of cropland) within the tract. Over 89 percent of the tract is rangeland, which indicates that the main land use currently is livestock grazing. Cropland areas are grazed by livestock during the off-season. During the crop-growing periods, livestock are held in rangeland or crested wheatgrass pastures.

Approximately 2,847 AUMs of native forage for livestock are produced annually on the tract. Assuming that the hay produced on the tract (see Table 2) was fed to livestock, an additional 908 AUMs would be available for wintering livestock. Winter grazing on the croplands varies tremendously, depending on the amount of moisture and the duration of cold weather. Under ideal conditions, at least 236 AUMs of fall-winter grazing would be available from the croplands on the tract. Normally, only about 100 AUMs are available on the tract because of the difficulty of providing stock-water during the winter months.

The grassland and sagebrush types have mixtures of grasses and sagebrush. The tract is part of the Prairie County grassland type, with inclusions of the Badlands grassland type—specifically shadscale and badlands subtypes (Payne, 1973). Besides the subtypes already mentioned, there are the upland hardwoods and the riparian shrub subtypes. Most of the upland hardwood areas are located in the central portion of the tract on northeast-facing slopes. Springs in the tract contribute to the sizable acreage of upland hardwoods and riparian shrub habitats.

About one-third of the tract is in poor to fair condition, while two-thirds of the tract is in good to excellent condition (Dawson County Conservation District, 1975). Many of the stream channels have spring water in them which, along with hilly topography, contributes to uneven grazing use.

Agricultural Economics

This section will be forthcoming under separate cover.

TABLE 2¹
Agricultural Land Use

Land Use	Tract Acres	Average Production Per Acre	Total Annual Production
Cropland	617	28.4 bushels	17,523 bushels
Hayland	227	1 ton	227 tons
Range	14,599	0.195 AUMs	2,847 AUMs
Other ²	354	55 bushels	18,700 bushels
Fallow	533	0	0
Total	16,330		

¹Data collected from Dawson County Agriculture Stabilization and Conservation Committee, Glendive, Montana, 1981.

²340 acres, oats; 14 acres, homesteads, cemetery, etc.

TABLE 3

BURNS CREEK

FARM/RANCH OPERATIONS 1/

OPERATOR	INSIDE COAL TRACT (acres)							OUTSIDE COAL TRACT (ACRES)							PERCENTAGE OF THE OPERATION WITHIN THE TRACT
	SMALL GRAIN CROP	HAY	GRAZING	SUMMER FALLOW	OTHER	TOTAL	PERCENTAGE OF TOTAL ACRES LEASED	SMALL GRAIN	HAY	GRAZING	SUMMER FALLOW	OTHER	TOTAL	GRAND TOTAL	
1	55	0	126	55	4	240	100	279	0	1,314	279	20	1,892	2,132	11.26
2	0	0	317	0	0	317	0	103	0	2,988	103	338	3,532	3,849	8.24
3	39	0	553	30	0	622	0	86	0	407	65	0	558	1,180	52.71
4	0	0	80	0	0	80	100	88	72	2,958	32	0	3,150	3,230	2.48
5	0	0	4,370	0	0	4,370	25.63	127	0	4,953	127	0	5,207	9,577	45.63
6	0	0	640	0	0	640	0	250	0	153	237	0	640	1,280	50.00
7	186	117	3,488	186	248*	4,225	100	1,245	60	1,471	1,090	0	3,866	8,091	52.22
8	296	110	2,124	221	85*	2,836	17.91	256	76	1,434	204	73	2,043	4,879	58.13
9	41	0	221	41	17	320	0	354	172	2,214	386	74	3,200	3,520	9.09
10	0	0	2,040	0	0	2,040	30.44	221	0	3,489	188	0	3,898	5,938	34.36
11	0	0	640	0	0	640	0	684	43	1,200	684	28	2,639	3,279	19.52
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
TOTAL	617	277	14,599	533	2/ 354	16,330		3,693	423	22,581	3,395	533	30,625	46,955	

1/ Data collected from Dawson County Agriculture Stabilization and Conservation Committee, Glendive, MT, 1981

2/ 340 acres, oats; 14 acres, homesteads, cemetery, etc.

* Homesteads within tract.

Residential Homes

Approximately six residential homes and three out-buildings are located within the tract. These homes are served by existing underground telephone cables and overhead electrical transmission lines.

Transportation and Access

Transportation access is available to the tract over existing county gravel roads from State Highway 254 at Bloomfield eleven miles to the west and from State Highway 16 seven miles to the south. The Burlington Northern Railroad is also located seven miles to the south parallel to Highway 16.

Existing Rights-of-Way (Corridors)

A 230 KV transmission line exists approximately five miles southeast of the tract. Also a 115 KV transmission line exists approximately 7.5 miles to the southeast. There is a 10-inch high-pressure gas pipeline belonging to Montana-Dakota Utilities four miles to the southwest. A cemetery is located on privately owned surface over leased federal coal (see Figure 3).

Recreation

The BLM manages only a 37.18-acre parcel of surface property within this tract and has therefore little inventory or research information available on recreation use. The tract has no legal access. Any recreation on this isolated parcel would necessitate landowner permission to be legal. Hunting probably does occur on the tract, but no facts substantiate this opinion. A county road dissects the unit. No wilderness values or public recreation facilities exist.

WILDLIFE AND FISHERIES

Most of the surface landowners on the tract will not allow BLM wildlife biologists on their land to inventory the areas over federal coal. Mobil Oil Corporation is conducting wildlife inventories on the tract. As of April 1, 1981, they have not released any of the information to BLM although negotiations are continuing. Areas over federal minerals must be adequately inventoried to apply unsuitability criteria. If the wildlife inventories are obtained from Mobil Oil and they are adequate, unsuitability criteria can be applied. If the information is not obtained or is inadequate, unleased federal coal on the tract cannot be offered for lease.

The tract is known to contain a proliferation of woody draws, some with live water, mixed among native prairie. The tract is used by some antelope and mule and white-tailed deer. There is a wintering concentration of 1.9 white-tailed deer per square mile and mule

deer numbers are even lower (Montana FW&P, 1980). Some hunting does occur on the tract for these big game species. The area is primarily valuable for sharptail grouse. The woody draws and native prairie are essential for them. These areas are also essential for animals such as cottontail rabbits, porcupines, many song birds and bobcats. Woody draws generally occupy only a small portion of the vegetation on any land area and are some of the most valuable to wildlife. Wentland (personal communications) says that the remaining native prairie is critical to all wildlife species, including sharptail grouse, especially in the northern portion of the tract where cover is provided by the Burns Creek drainage. No threatened or endangered species are known to occur on the tract nor are there any fish species of special concern or public access fishing ponds on the tract (Elser, et al. 1980).

CULTURAL RESOURCES

The Burns Creek tract has not been systematically inventoried to date. Information from existing inventories (Davis, 1976, BLM unpublished data; Greiser, 1980) suggests that the predominant prehistoric sites should be lithic scatters of varying size, density and function (ca. 70-80%). Other expected prehistoric sites include stone circles (ca. 10%), ceramic-bearing sites, rock shelters and bison kills (ca. 10% combined). Expected historic resources include homestead and ranching remains (ca. 50%), historic graffiti and rock art (ca. 20%), freight roads, dugouts, stone cairns, trading posts, burials and battle sites (ca. 30% combined). Further information on cultural resource distribution and significance cannot be quantified prior to inventory.

BLM-sponsored contract inventory in the Fort Union Coal region is scheduled for the summer of 1981 to generate information sufficient to identify and predict the nature, occurrence and significance of cultural resources in the tract in the regional EIS. Subsequent to inventory and prior to the regional EIS, BLM will apply unsuitability criterion 7 (43 CFR 3461.1 [g]) to all identified properties and will consult with the Montana State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) regarding the effect of coal leasing on National Register-eligible properties, in accordance with the ACHP Programmatic Memorandum of Agreement with BLM, OSM and USGS, Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended), and 36 CFR 800.

VISUAL RESOURCE MANAGEMENT

The Burns Creek tract lies in a complicated landscape zone. The South Fork of Burns Creek and parts of its associated drainage system dominate the physical

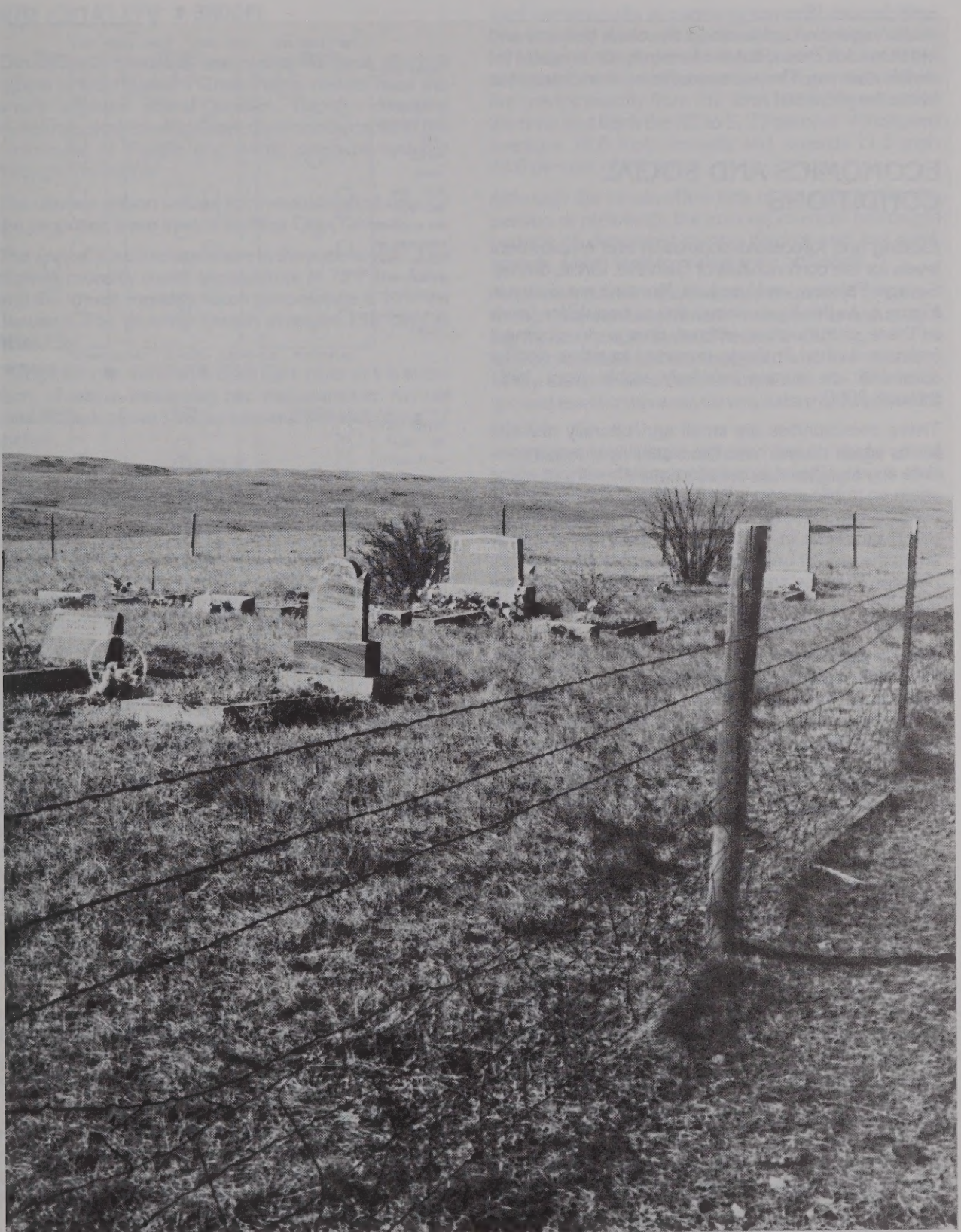


Figure 3. A buffer must protect this Lutheran Cemetery located approximately midway between Bloomfield and Savage.

environment. The rough terrain is often termed badlands. Vegetation exists along the creek bottoms and within coulee draws, but the terrain is too irregular for dryland farming. There are no adverse visual intrusions within the proposed unit.

ECONOMICS AND SOCIAL CONDITIONS

Existing and forecasted population and employment levels for the communities of Glendive, Circle, Sidney, Savage, Fairview, and Lambert, Montana are shown in Figure 6. As this figure shows, future population levels in these communities without energy development (refer to dashed line) are expected to either decline somewhat or remain relatively stable from 1981 through 2000.

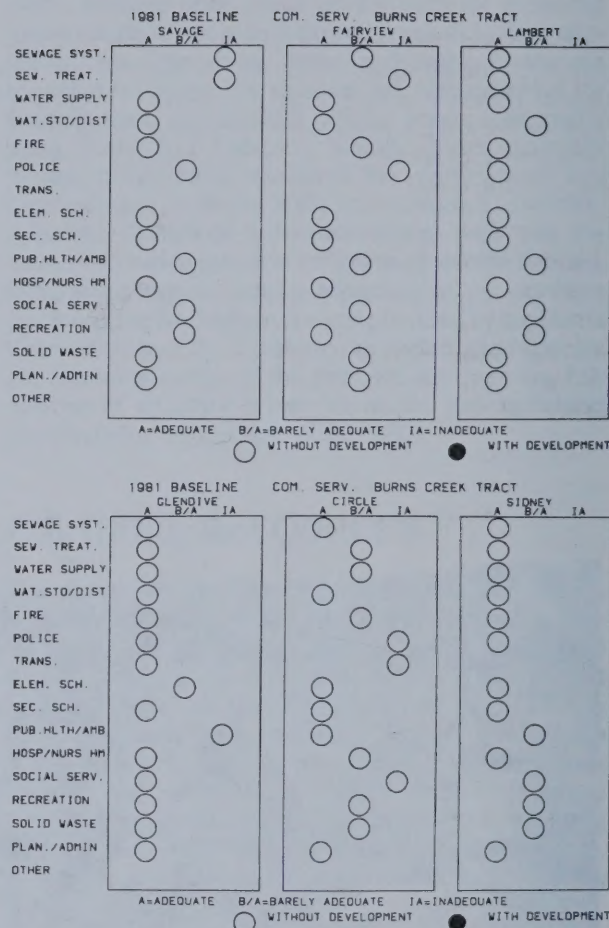
These communities are small agriculturally oriented towns which do not have the capability to accommodate any significant population growth without some strain on public services. As Figure 4 shows, few of the above communities are presently (1981) experiencing some problems in providing an adequate or barely adequate level of one or more types of public services. However, Savage and Fairview (Richland County) are currently experiencing inadequate sewage treatment facilities for their present population.

Richland County residents (thirty-two interviewed) identified traffic and road maintenance, availability of medical care, absence of retail opportunities, and lack of entertainment facilities as the major existing service problems in the area. In Dawson County (thirty-six interviewed), medical care, retail opportunities, and the availability of recreation and entertainment facilities were also mentioned as the major service shortages in those communities.

While reclamation is the major concern of those persons interviewed in both Dawson and Richland Counties, there remained a very high level of support for local mining development. This level of support approached 80 percent in Dawson County and 75 percent in Richland County, which means that roughly 3/4 of the persons interviewed either support, without qualification or with qualification, local coal mining. While these levels of support appear to be quite high, this does not necessarily mean that residents are willing to unconditionally accept expanded mining in the area. Much of this support is qualified by the potential scale and location of development, the nation's need for energy, and the local area's need for economic stability and growth. Evidently, many people see attendant employment opportunities as a major benefit of coal development.

Leaders in Dawson and Richland counties also support development, but this support is more qualified than in the general population. Again, the Nation's need for

FIGURE 4



SOURCE: Respective city/county or regional planners.

energy and local economic stability were cited as the major reasons for support of development. The major concerns of leaders in Dawson County included reclamation, protection of surface and groundwater, and the future availability of revenues required to deal with growth. In Richland County, availability of housing, reclamation, the necessity for adequate planning lead time, and the availability of funding were given as the major concerns.

The major drawbacks to living in both Dawson and Richland counties, according to residents interviewed, are the climate, the lack of retail opportunities, road maintenance and traffic and, in Sidney, the recent influx of newcomers due to oil and gas activity.

The major benefit mentioned by residents of these areas is the informal, small town atmosphere that presently exists. Friendliness and openness of residents, along with peace and quiet, are widely appreciated by people who now live in these areas.

AIR QUALITY

The semiarid climate of east central Montana, which is typical of the Northern Great Plains, results from the area's extreme inland location. Rapidly changing meteorological conditions are common because of the movement of Pacific and Arctic pressure systems through the region.

The climate station utilized for meteorological data for the proposed lease tract is at Miles City (Table 4).

The annual mean temperature in the area is 46°F. The highest monthly mean temperature is 75°F (in July), and the lowest monthly mean temperature is 15°F (in January). The growing season averages 158 days at Miles City.

Precipitation in the area is quite light. Most of it is in the form of rain in late spring and early summer. Annual rainfall totals about 14.2 inches, and snowfall about 32 inches.

TABLE 4
Meteorological Data for Selected Sites*

	Miles City
Temperature, °F	
Mean Annual	46
Mean Monthly Minimum (Jan.)	15
Mean Monthly Maximum (July)	75
Growing season for Grass (temperature 32°F), days	158
Precipitation, in.	
Annual Average Rainfall	14.2
Monthly Range Rainfall	0.5-3.1
Annual Snowfall	32.2
Average No. of mo/yr with Snowfall	10
Annual Stability (by class), % occurrence	
Class A, B, C	15.8
Class D	54.3
Class E, F, G	29.9
Wind Direction	SE-S, 27% W-NNW, 35%
Windspeed, mph (% of time)	0-3.5 (8.4) 3.6-6.9 (23.3) 7.0-11.5 (39.6) 11.6-18.4 (21.3) 18.5-24.2 (5.5) >24.3 (1.8)
Average Windspeed, mph	10.6

*Sources: National Oceanic and Atmospheric Administration, 1980
Powder River Site Specific Analysis, 1981

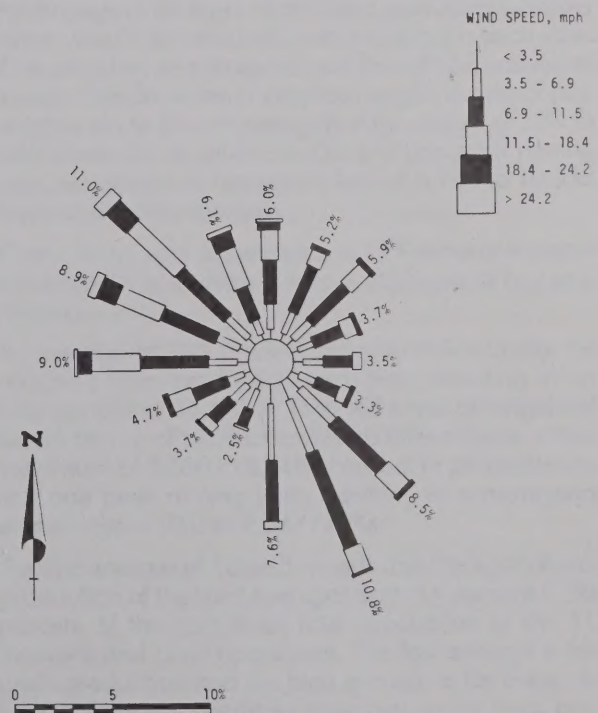
Wind data used in this analysis were obtained at Miles City, the only station in the area that had data suitable for input into the dispersion model used. The wind rose in Figure 5 represents a summary of these data. Winds are predominantly from the W to NNW 35 percent of the time and from the SE to S, 27 percent. Windspeed averages 10.6 mph annually and exceeds 11.5 mph 28.6 percent of the time.

Although the terrain offers little obstruction to the dispersion of pollutants, the area experiences prolonged periods of depressed mixing heights and low windspeeds, which tend to concentrate pollutants.

According to total suspended particulates (TSP) monitoring data, annual geometric mean in this area is 25.9 ug/m³ and the arithmetic mean is 42.5 ug/m³. The sparse population in the area precludes consideration of the sampler as an urban impacted site. The background level for this analysis was determined to be 42.5 ug/m³.

No Class I area falls within the impact range of the proposed tract. Visibility in the area ranges from 45 to 70 miles.

FIGURE 5



Miles City Wind Rose

CHAPTER III

ENVIRONMENTAL CONSEQUENCES

TOPOGRAPHY

Mining and reclamation would result in less contrasting topography. Original drainage patterns would be reestablished and the tract would appear as it did before mining.

GEOLOGY

Production through the life of the mine is estimated at 535.9 million tons of lignite. During this time, the tract would be temporarily committed to a single use that would in turn impact other uses.

The lignite removed by mining and that portion left by current recoverable techniques would be lost, an estimated 59.5 million tons, from future use.

SOILS AND RECLAMATION POTENTIAL

The proposed action would have a significant short-term impact on the soil in the tract (see Table 1). By the end of mine life, 16,330 acres would be disturbed.

Soil impacts include: Wind and water erosion, change in soil structure and natural fertility, and soil compaction from haul roads and significant problems in revegetation and stabilization on steep slopes.

In the tract, 56 percent of the soils have a low wind erosion potential and 54 percent of the soils have a moderate water erosion potential (see Table 1). Proper seeding of the stockpiles will reduce this erosion potential.

Disturbances of the soil would result in alterations of soil structure and porosity. This alteration would affect permeability, infiltration rates, soil-air and soil-water relationships and bulk density. The natural fertility would be affected by disruption of the nutrient cycle and a decrease in organic matter content within the soil. Salinity content would increase as a result of the lower calcareous horizons being brought to the surface.

Reconstruction potential is determined by soil hazard conditions. The tract is rated 38 percent fair and 62 percent poor for reconstruction. Suitability of the soil material for plant growth is rated as 3 percent good, 58 percent fair, 35 percent poor and 4 percent unsuitable (see Table 1). The soils rated poor can be reclaimed, but would require more intensive and costly management to be revegetated and stabilized.

HYDROLOGY

Water needed for industrial use in the mining operation could be provided by probably capturing seepage water in the pits or by wells tapping the Tongue River aquifer. Mining in the Tongue River aquifer would cause destruction of the 13 known wells within the tract and could cause lowered water levels and degradation of chemical quality of the ground water in nearby wells. The potential for disturbance of off-site wells cannot be quantified with current data.

No significant impact is anticipated to surface water flow or to the deeper aquifers which could be used to provide the necessary public supplies.

LAND USES

Vegetation and Agricultural Production

The leasing and development alternative would have a significant short-term impact on individual agricultural operations in the tract. By the end of the mine life, 16,330 acres of the tract would be disturbed, in addition to 160 surface acres used for mine facilities.

An average of 24 acres of cropland, excluding summer fallow, would be removed from production each year. This would be an average annual loss of 682 bushels of wheat. This 24 acres of cropland would be out of production ten to fifteen years with a maximum of 239 to 364 acres out of production in any one peak mining year, resulting in a maximum loss of 6,788 to 10,338 bushels of wheat annually.

Peak mining year disturbance of 277 acres of hayland would result in an annual loss of 227 tons of hay production.

An average of 363 acres of rangeland would also be removed from production each year, resulting in an average loss of 71 AUMs. This 363 acres of rangeland would be out of production ten to fifteen years with a maximum of 3,650 to 5,548 acres out of production in any one peak mining year, resulting in a maximum annual loss of 712 to 1,082 AUMs.

Further analysis of Table 3 reveals that the agricultural production of the tract averages from 14 percent to 39 percent of the combined total production of the 11 livestock and grain operations. The low average is for grain production and the high average is for livestock forage. Only two operators grow hay on the tract, producing a major part of their hay there. Only the smaller of the two appears to be dependent on the tract as a major source of income.

All 11 operators farm lands outside the tract boundaries. However, three operators only have leased land inside the tract. Three other owner-operators also lease some land inside the tract.

From a grain-growing standpoint, seven of the operators are classed as small (less than 1,000 acres), three are medium-sized (1,000 to 2,000 acres), and a large operator farms more than 2,000 acres outside the tract. At least four of the seven small operators may have to cease operation due to the impact of mining on their operation. One medium-sized operation may also cease operation, due to the percentage of his operation that is inside the tract. The other operators may successfully stay in business in spite of the loss of use of their leases and fee lands.

Regionally, these losses would not pose significant reductions in area agricultural production. Analysis of economic impacts, both to individual operations and regionally will be forthcoming under separate cover.

Chief items of concern on the tract are the upland hardwood and riparian shrub subtypes. These areas are vital to many wildlife species, especially mule deer, and it is doubtful that these areas can be restored after mining and subsequent reclamation.

The Montana Department of State Lands will set the standards for establishing a diverse and effective permanent vegetative cover on all rangeland areas, with coordination and cooperation from the Office of Surface Mining and the Bureau of Land Management.

Agricultural Economics

This section will be forthcoming under separate cover.

Residential Homes

Approximately six residential homes and three out-buildings would have to be relocated or a 300-foot buffer zone maintained, which may be waived by agreement of owners of the occupied buildings. A 100-foot buffer zone must be maintained around the cemetery. A radio tower should be relocated in advance of mining. A school is abandoned and no longer used.

Transportation and Access

Access is available to the tract via a county road and 1.5 miles of private road; however, the roads would have to be upgraded to accommodate heavy traffic use during wet seasons. Approximately 23 miles of private and county roads within the tract would eventually have to be relocated as mining progresses. Most of the haul road is outside the unit and would have to be acquired from private land owners.

The major impact on the present transportation system due to mining at the Burns Creek tract would be an

increase in volume on existing transportation modes. This would result in increased accident rates, system deterioration, rising maintenance costs and decreased efficiency if not mitigated.

Existing Rights-of-way and Needs

Rights-of-way for transmission of electricity to the mine would be needed. The existing 230 KV right-of-way 5 miles to the south could be used.

Recreation

The recreation potential of this tract might actually improve with lease activity as better roads would serve the area but landowner permission to access would still govern. The significant impacts during mining would be felt off-site. The influx of mine workers would cause additional pressure on existing recreation facilities in the region or uses such as hunting and fishing within the region. The exact concentration or location of this activity is not predictable at this time.

WILDLIFE AND FISHERIES

Destruction of any woody draws would be a significant impact to the wildlife species on the tract, especially sharptail grouse. If the woody draws are declared unsuitable, the impacts would be greatly reduced. There would still be short-term impacts from disturbance during mining and reclamation. Reclamation of these areas has not been achieved on a broad scale and the impacts would generally be long-term and irreversible if it is not successful.

Poaching and road kills have increased dramatically in areas of Montana, Wyoming and Colorado where energy development has occurred. The problem is compounded in areas where shift changes coincide with feeding periods, especially big game (Streeter, et al., 1979). The same would probably occur in this area.

Actions to mitigate these impacts available to entities other than BLM would be to provide mass transportation of workers and adjusting the times of shift changes which would greatly reduce poaching. This has been used successfully in other mining areas (Streeter, et al., 1979). Providing funds for the Montana Department of Fish Wildlife and Parks for increased law enforcement or adoption of a poaching clause in union contracts would also help.

CULTURAL RESOURCES

Until a systematic inventory of cultural resources in the tract is completed, no definitive assessment of impacts can be made. All cultural resources within the tract

would be subject to direct impact from construction of mine facilities, haul roads, water development, and mining activity. Cultural resources not immediately impacted by the above activities are subject to impacts from increased erosion, access and vandalism. Direct impact would result in damage and destruction to cultural resources, artifacts, their immediate environmental context and the information these contain. Subsurface cultural resources not previously located by surface inventory would also be destroyed.

Development of alternatives for avoidance and preservation of identified properties is preferred, as these would minimize impacts to cultural resources. Should the tract be leased and these alternatives not be feasible, a scientific program of data recovery could be developed and implemented for all National Register properties within the tract.

VISUAL RESOURCE MANAGEMENT

Mining this tract would significantly alter the existing landscape character. Visual intrusions would include equipment and structures necessary for the mining operation (roads, powerlines, shops, buildings, etc). These items are quickly visible in a prairie setting, because they create new forms, lines, contrast and horizon situations. Land disturbance would be another aesthetic impact. Over 16,000 acres of rough badlands terrain would give way to a more orderly landscape form. The mining operation would be visible from the county road running from Bloomfield to Intake.

NET ENERGY ANALYSIS

A net energy analysis was calculated using the guidance contained in BLM Washington Office Information Memo 80-640, July 17, 1980. Approximately 37.7 British thermal units (Btus) would be expended to produce a pound of coal. That pound of coal would, in turn, produce about 6,750 Btus. The ratio of energy expended to that energy produced is 1 btu/179 btus.

ECONOMICS AND SOCIAL CONDITIONS

Construction and operation of the Burns Creek mine would result in significant impacts upon services in some communities within the areas as a result of population growth associated with employment opportunities. Figure 6 shows forecasted community employment and population levels through 2000 both with and without development of the Burns Creek tract. As these figures show, Glendive, Circle, Sidney, Savage, Fairview and Lambert, Montana would experience a significant

FIGURE 6

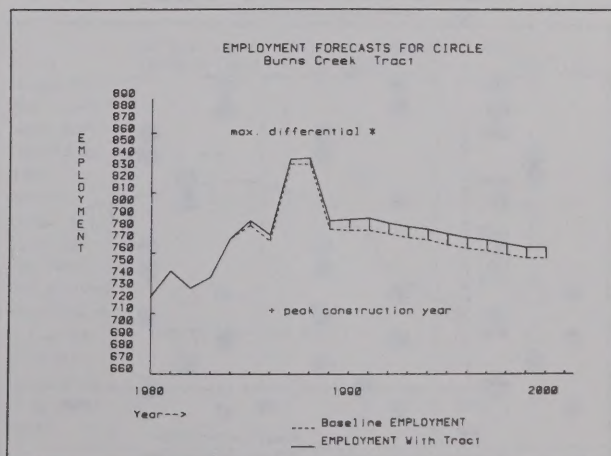
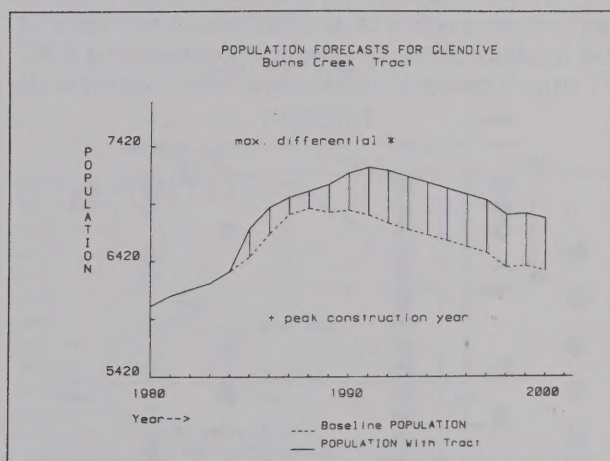
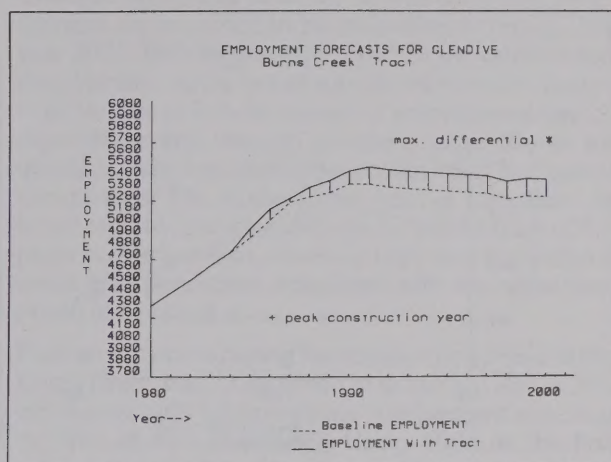


FIGURE 6 (continued)

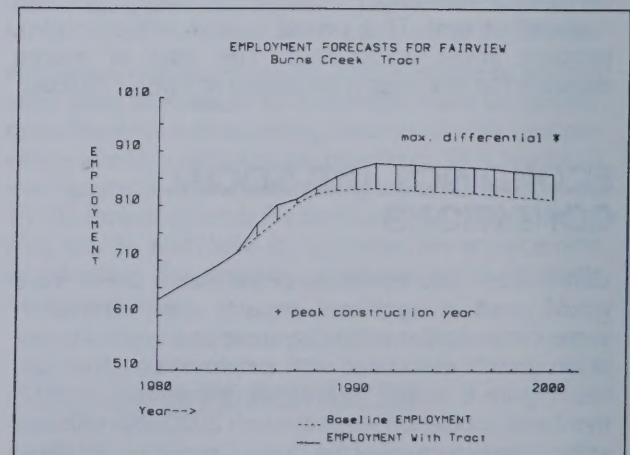
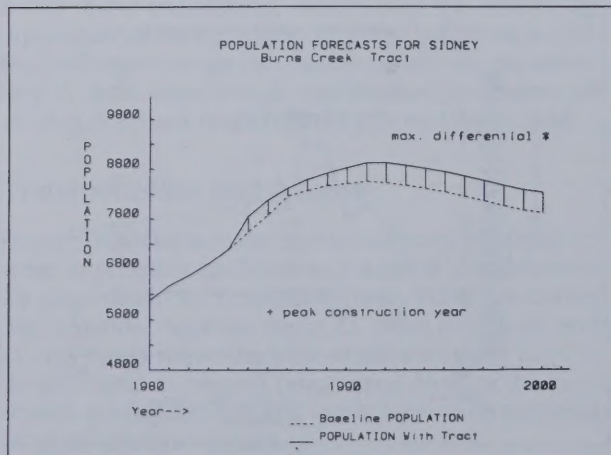
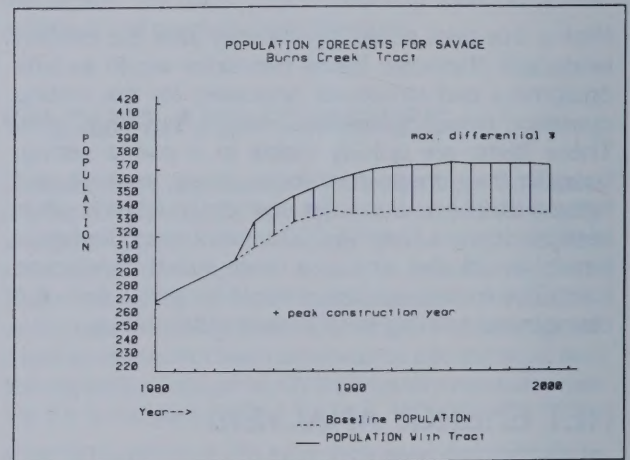
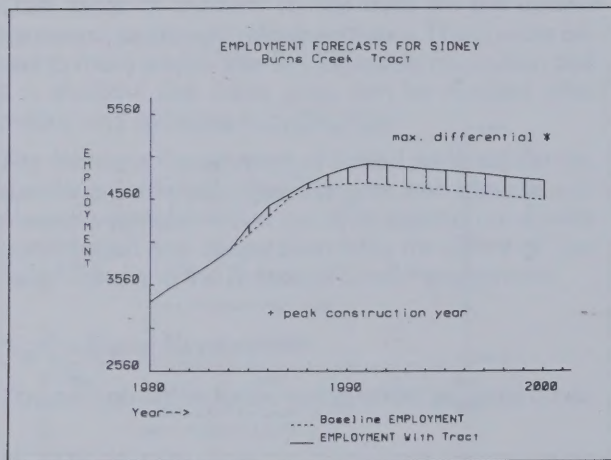
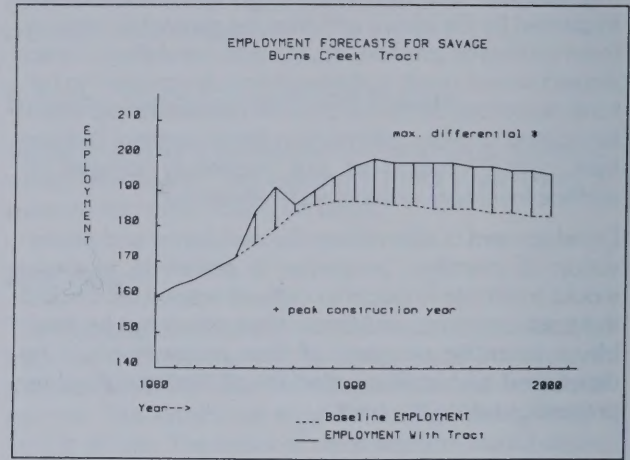
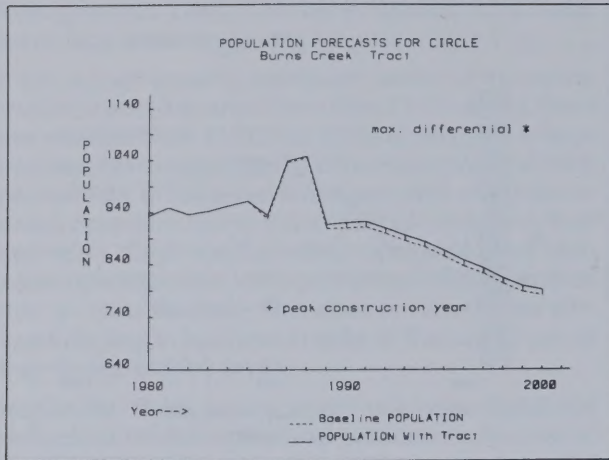
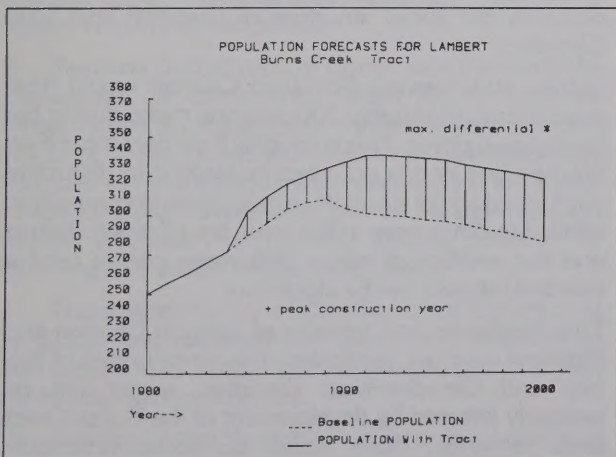
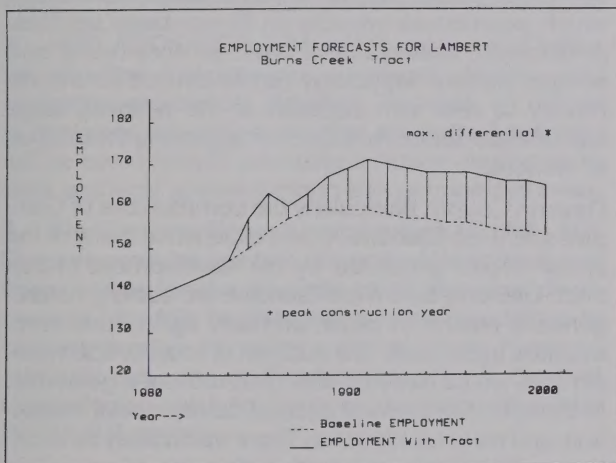
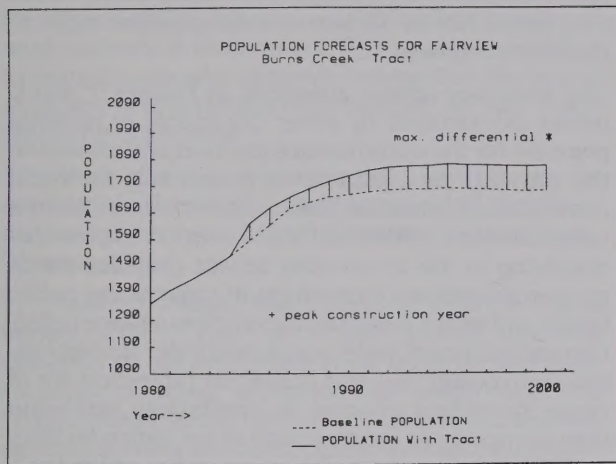


FIGURE 6 (continued)

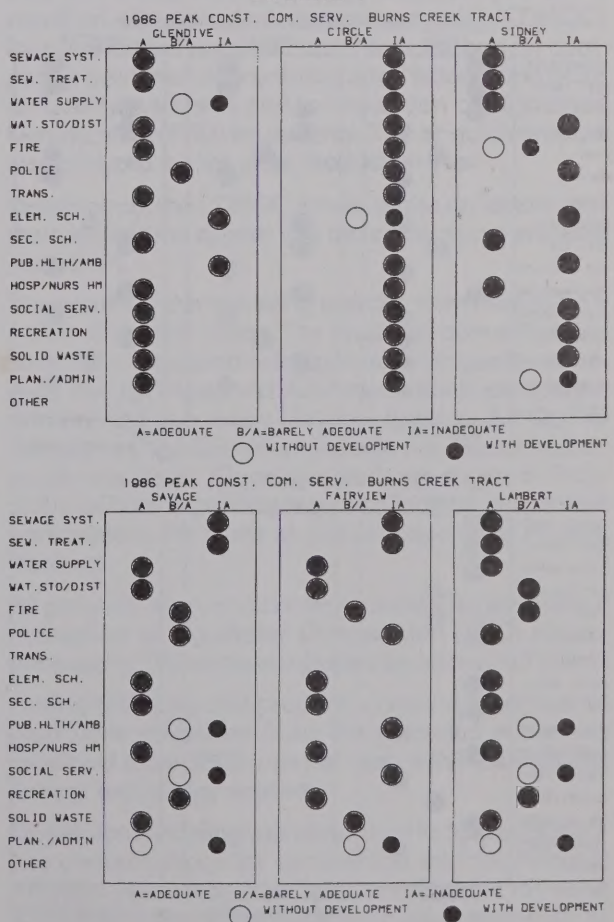


increase in both population and employment as the result of the development of the tract.

Changes in regional personal income from tract development are expected to be insignificant through the year 2000. The communities in which the workers and their families reside would experience some increases in economic activity as a result of employment payroll expenditure and through company expenditures for goods and services during the construction and operation phases. The Burns Creek tract is forecasted to boost regional personal income by a maximum of 0.6 percent over baseline values by 1991 and beyond as a result of expenditures associated with the operations phase of this tract.

Peak employment during the construction phase of the Burns Creek tract is expected to occur in 1986 at 260 employees with full operations employment expected in 1991 at 440 employees. Using 1986 as the first primary impact date, it is estimated that the communities of Glendive, Circle, Sidney, Savage, Fairview and Lambert would experience an inadequate level of one or more community services as a direct result of the 1986 peak construction employment/population levels associated with construction of the tract (Figure 7).

FIGURE 7



SOURCE: Mountain West Research, Inc., 1981.

SOURCE: Respective city/county or regional planners.

Glendive, for example, is forecasted to face an inadequate water supply situation as a result of population growth attributable to the construction of the Burns Creek tract. Additionally, Bloomfield, Richey, Lindsay and West Glendive, Montana would experience an inadequate level of some community services by 1986 without tract development. A tract-related population influx in these communities would further exacerbate an inadequate service situation, however, the inadequacy of these services could not be directly tied to tract development.

Full operation of the Burns Creek tract (i.e., 1991 and beyond) is also expected to result in serious impacts on community services. Figure 8 shows that Sidney, Savage, Fairview and Lambert would all have one or more public services which would be inadequate as a direct result of the population influx resulting from tract operation. Fairview, for example, would experience inadequate fire protection and planning services while the sewage treatment situation in Fairview would be inadequate even without development. Additionally, the communities of Circle, Bloomfield, Richey, Glen-

dive, Lindsay and West Glendive are forecasted to face inadequate service situations even without development. Construction and operation of the Burns Creek tract would further worsen an inadequate situation in these communities.

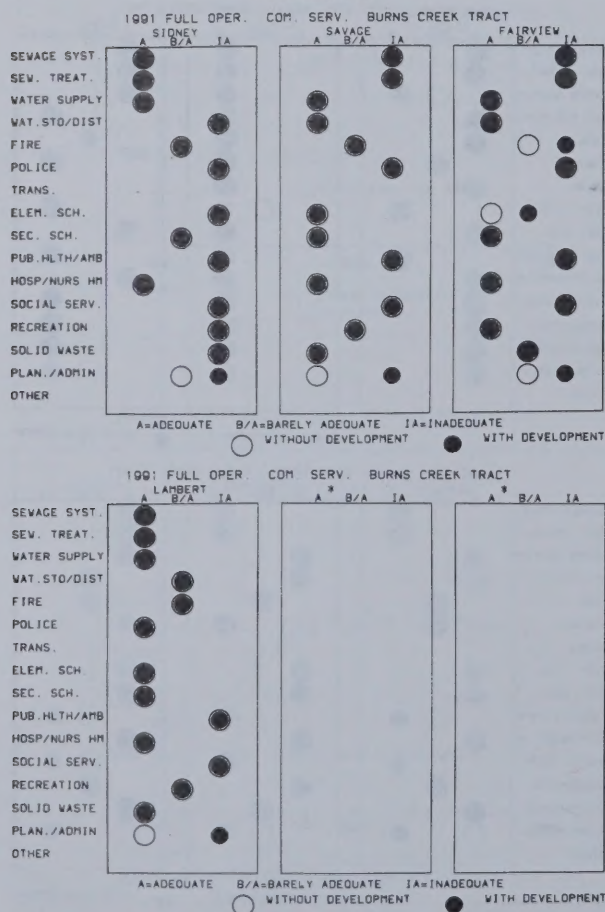
The adequacy ratings appearing in Figures 7 and 8 reflect assessments by either city-county or regional planners for the communities involved and constitute the planners best judgments concerning the fiscal (revenue/cost) situation likely to be encountered by the communities in 1986 and 1991. Several of the services appearing in the community service graphics are of greater importance than others in maintaining public health and safety. Basic services such as sewage collection and treatment, water supply and water storage/distribution, health care and police/fire protection are of more immediate concern to community well-being than are non-basic services such as recreation facilities and libraries. Consequently, communities which experience impacts to these basic services would undergo somewhat greater difficulties than would a community which experiences impacts on its non-basic services. Additionally, inadequacy of basic services (water and sewage systems especially) can be difficult for a community to deal with because of the relatively large capital expenditures required for upgrading these types of services.

Dawson County, particularly the communities of Glendive and West Glendive, would experience many of the social effects generated by the development of this tract. Glendive and West Glendive are socially heterogeneous relative to other, primarily agricultural communities in the area. The addition of roughly 650 more persons would likely be absorbed without a great deal of disruption in terms of political, family, social interaction, and religious behavior. There would likely be short-term adjustments required during the construction period of the mine. Once the operations phase is reached, it is unlikely that significant changes would occur in the social structure of Glendive and West Glendive.

Sidney and Fairview (Richland County) would have populations of roughly 500 persons more during the operational phase. This is roughly 5 percent more than the baseline and is not seen as leading to disruptive changes in social structure. Again, these communities, relative to other ones in the area, are relatively diverse and the addition of about 500 more people (above baseline) should not be significant.

The drawbacks and benefits of living in Dawson and Richland counties, particularly the communities of Sidney and Glendive-West Glendive, would not be seriously affected by development of the Burns Creek tract. However, there would be some noticeable changes in the social pace of the community, traffic, and the existence of newcomers. These changes would result in minor reduction in some persons' satisfaction

FIGURE 8



SOURCE: Respective city/county or regional planners.

with the social atmosphere of the areas, so fully appreciated by residents who live there now. It is possible that the larger population base would attract firms dealing in retail trade and entertainment. This would be appealing to many people who presently believe that the lack of shopping and entertainment facilities are the major problems of the area.

Mitigation of social and economic impacts can be accomplished through several technical and/or financial categories from both federal and state sources. These include:

1. Mountain Plains Federal Regional Council Energy Impact Office. This office has several functions designed to alleviate impacts on counties and communities, including: a) provide information about and facilitate applications for technical and financial assistance, b) develop and participate in workshops for state, local, federal, and industry people on impact assessment and mitigation, c) encourage and facilitate development of local energy impact assessment task forces.
2. HUD, USGS, DOE, EPA and Department of Labor are all active in sponsoring advanced planning and mitigation assistance. However, because of federal budget cuts, it is unclear whether any federal agencies will be committed to providing technical assistance to state and local governments in energy impacted areas.
3. The Farmers Home Administration (FmHA) 601 Program provides grants to designated (approved) coal impact areas for planning, site acquisition, and development of public facilities and services in addition to housing on sites owned by a city or county. However, currently there are no Montana counties in the Fort Union Region which are designated as being eligible for FmHA 601 monies.
4. States currently receive 50 percent of the federal mineral leasing royalties. This money could be used to mitigate impacts in those areas which are impacted by federal mineral development.
5. Montana Department of Commerce (formerly the Department of Community Affairs (DCA)) provides direct technical assistance to communities in the coal resource areas of eastern Montana. This assistance includes workshops and training sessions in local planning and impact assessment, growth management and impact mitigation techniques, funding sources for planning and public facilities and others.
6. The eastern Montana field office of the Department of Social and Rehabilitative Services is available to assist eastern Montana communities assess and plan for human service impacts.
7. Funding by the Montana Coal Board is available to local governments which have been required to expand the provision of public services as a consequence of large scale development of coal mines and coal-using energy complexes. These funds originate from an 8.75

percent portion of the revenues from Montana's coal severance tax.

Technical reports are available which discuss the methodology used in the economic or social analyses.

CLIMATE AND AIR QUALITY

Impacts on climate from the proposed action would be localized and insignificant. The modification of surface contours and surface reflection due to redistribution of soils and removal of vegetation may produce slight localized changes in windspeed and direction, temperature, and humidity. Reclamation with reestablishment of vegetation would largely mitigate these impacts over the long term.

The methodology for determining the air quality impact of particulate emissions consisted of (1) obtaining mine profiles for each tract from the U.S. Geological Survey (USGS), (2) obtaining emission factors for individual surface coal mining operations, (3) using the mine profile and emission factors for calculations of total emissions, (4) entering the emission data into a modified climatological dispersion model (CDMQC) for prediction of ambient concentrations, and (5) comparing predicted concentrations to National and State air quality standards and to Prevention of Significant Deterioration (PSD) increments. The air quality impact was analyzed for the peak production year.

Details about the CDMQC model, emission factors, and their application appear in a technical report available from BLM.

The results of the modeling exercise were plotted on a series of isopleth maps. The predicted concentrations were then compared with applicable air quality standards. The 1970 Clean Air Act Amendments established primary and secondary National Ambient Air Quality Standards (NAAQS). Montana also has established air quality standards. These standards are shown in Table 5. The Montana primary standard for total suspended particulate is the same as the corresponding Federal standard.

All pollutant sources must be evaluated to determine if Prevention of Significant Deterioration (PSD) regulations apply. These standards are also shown in Table 5.

During the peak coal production mining period, total particulate emissions from the proposed action are predicted to be 3863 tons per year, with best available control technology applied.

Dispersion modeling was performed to predict particulate concentrations for comparison with the National Ambient Air Quality Standards and State of Montana standards. Areas within the active mining area, such as the mine facilities, pit areas, and reclamation areas, are not subject to these standards.

TABLE 5
Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards		Montana State Standards	
		ug/m ³	ppm	ug/m ³	ppm
Sulfur Dioxide	Annual (Arithmetic)	80	0.03	60	0.02
	24-hour	365	0.14	260	0.10
	3-hour			650	0.25
Total Suspended Particulate	Annual (Geometric)	75		75	
	24-hour	260		200	
Carbon Monoxide	8-hour	10,000	9		
	1-hour	40,000	35		
Photochemical Oxidant	1-hour	240	0.12		
Nitrogen Dioxide	Annual	100	0.05		
Lead	3-month	1.5			

Prevention of Significant Deterioration (PSD) Regulations

Class II area	ug/m ³
Sulfur Dioxide	
Annual Arithmetic mean	20
24-hour maximum	91
3-hour maximum	512
Particulate matter	
Annual Geometric mean	19
24-hour maximum	37

Source: National Ambient Air Quality Standards 1970; Montana State Department of Health and Environmental Sciences.

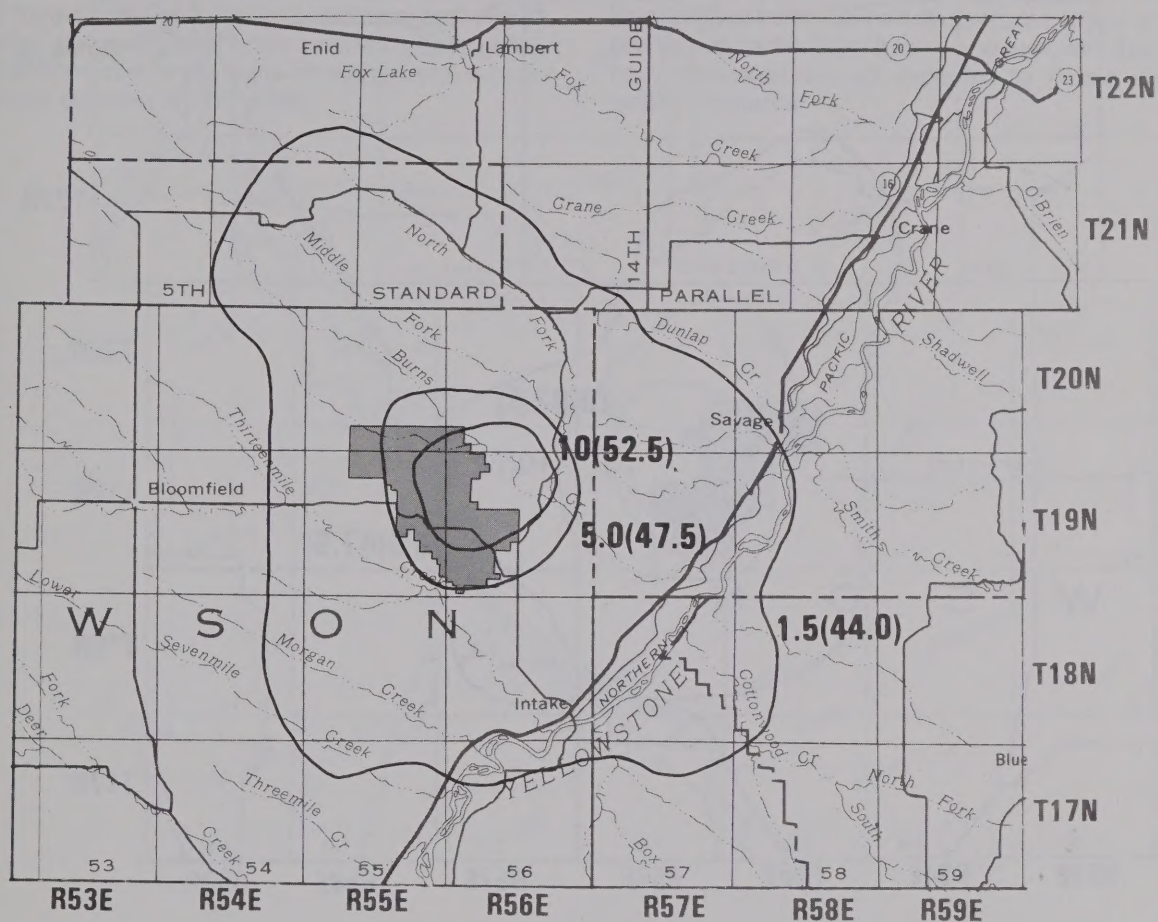
The isopleth lines on Figure 9 indicates annual geometric mean average particulate concentrations that will result from implementation of the proposed action. During peak coal production, the highest annual geometric mean concentration at a location off the mine site would be 13.7 ug/m³. With a background concentration of 42.5 ug/m³ (see Chapter 2), the highest annual average ambient concentration would be 56.2 ug/m³. This value is less than the Montana particulate standard of 75 ug/m³.

In addition to the annual particulate standard, Montana has a 24-hour standard of 200 ug/m³ that cannot be exceeded more than once a year off the mine site. Figure 10 shows predicted 24 hour maximum particulate concentrations that would result from the proposed action. The isopleths represent a composite of 24-hour levels; therefore, the values occur over the year period

indicated rather than simultaneously. 24-hour maximum values with the proposed action during full coal production would be as high as 39.2 ug/m³ during the end of mine life period. With the background concentration added, ambient levels would be 81.7 ug/m³. These levels are within the Montana 24-hour standards.

In addition to the annual and maximum particulate standard, Montana has a PSD incremental standard of 19 ug/m³ annually and 37 ug/m³ for a 24-hour maximum which cannot be exceeded more than one time per year. The proposed mining activity may violate the 24-hour standard at least one time per year given the worst case conditions when heavy wind conditions in the southwesterly direction occur at peak production.

Several small sources of gaseous pollutants are (sulphur dioxide, ozone, and nitrogen dioxide) associated

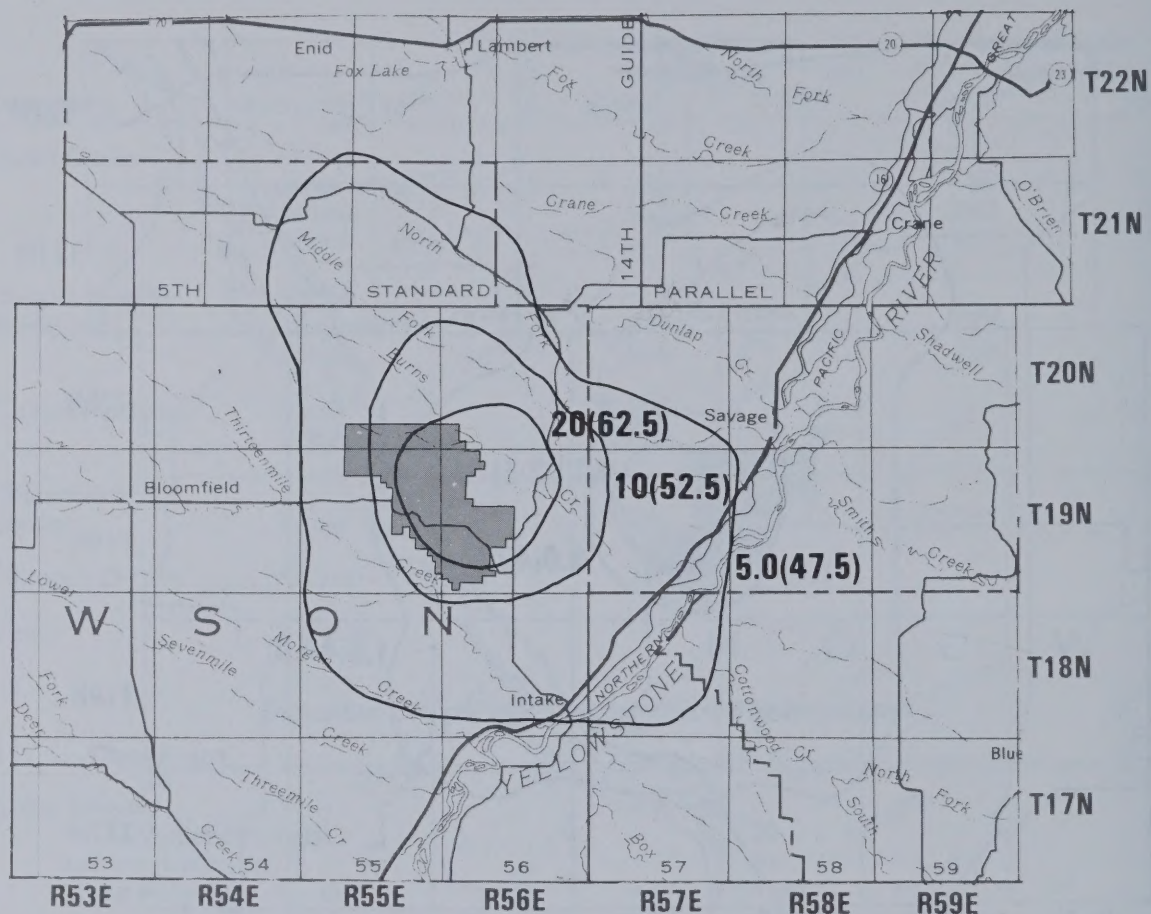


Burns Creek Tract

TSP Annual Average Concentration ($\mu\text{g}/\text{m}^3$) Isopleths

Note: Number in parenthesis indicates predicted concentration plus background concentration.

FIGURE 9



Scale 1:500,000

10 0 10 20 Miles

Burns Creek Tract

TSP Maximum 24-hour Concentration (ug/m³) Isopleths

Note: Number in parenthesis indicates predicted concentration plus background concentration.

FIGURE 10

with surface coal mining operations. These include haul trucks, front-end loaders, scrapers, and dozers. Sources also include light-duty vehicles (chiefly pickup trucks) operated in the mine and employee vehicles operated on mine access roads.

Review of the Site-Specific Analysis Reports for the Powder River tracts that had similar tons per year of coal production to the Fort Union tracts indicates that gaseous emissions are not expected to violate any air quality standards.

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

REFERENCES

WILDLIFE

- Elser, Allen A., M. Gorges & L. Morris. 1980. "Distribution of Fishes in Southeastern Montana". Montana Department of Fish, Wildlife & Parks and U.S. Department of Interior, Bureau of Land Management, Miles City, Mt.
- Matthew, Bill, 1981. Personal Communication. Wildlife Biologist, U.S. Department of Interior, Bureau of Land Management, Miles City District Office, Miles City, Montana.
- Montana Department of Fish, Wildlife & Parks. 1980. "Statewide Wildlife Survey and Inventory, Project No: W-130-R-11." Helena, Mt.
- Morris, Lani, T. Hightower, A. Elser. 1981. "An Aquatic Resources Assessment of Selected Streams in the Lower Yellowstone Basin". Montana Department of Fish, Wildlife & Parks prepared for Bureau of Land Management, Miles City, Mt.
- Streeter, Robert G., R. Moore, J. Skinner, S. Martin, T. Terrel, W. Klimstra, J. Tate, and M. Nolde. 1979. Energy Mining Impacts and Wildlife Management: Which Way to Turn. Transactions of the 44th North American Wildlife and Natural Resources Conference. Wildlife Management Institute, Washington, D.C.
- Wentland, Harold. 1980. Personal Communication. Wildlife Biologist, Montana Department of Fish, Wildlife & Parks, Miles City Regional Office, Miles City, Montana.

CULTURAL RESOURCES

- Clark, Jerry and Michael Wilson. 1980. The Ayers-Frazier Bison Trap, (24PE30): A Late Plains Archaic Bison Kill on the Lower Yellowstone River. M.S. on file. Bureau of Land Management. Miles City.
- Davis, Carl M. 1976. A Preliminary Archaeological Reconnaissance Survey, Bureau of Land Management Lands, Southeastern Montana. University of Montana. Missoula.
- Greier, T. Weber. 1980. Class II Cultural Resource Inventory, Big Dry Resource Area, Prairie County, Montana. For the Bureau of Land Management, Contract number. Y.A-512-LT9-250. Histroical Research Associates. Missoula.
- Johnson, Ann M. 1977. "Woodland and Besant in the Northern Plains: A Perspective". Archaeology in Montana, Vol. 18, No. 1, pp. 27-42. Bozeman.
- Reeves, Brian O.K. 1970. "Cultural Change on the Northern Plains, 1000 B.C. -A.D. 1000". Ph.D. Dissertation, University of Calgary, Alberta.
- U.S. Department of the Interior, Bureau of Land Management. 1980. Unit Resource Analysis, Circle and Richland Glendive Planning Units, Miles City District. Miles City District Office.
- Unit Resource Analysis, Prairie Planning Unit, Miles City District. 1980. Miles City District Office.
- Unit Resource Analysis, Kinsey Planning Unit, Miles City District. 1980. Miles City District Office.
- Unit Resource Analysis, Haxby, McCone and Musselshell Planning Units, Miles City District. 1978. Miles City District Office.
- Class I Inventory, Historic and Prehistoric Resources. 1980. Miles City District Office.

HYDROLOGY

- Dodge, K.A. and G.W. Levings. 1980. Measurements of Discharge, Gain or Loss in Flow, and Chemical Quality of the Poplar and Redwater Rivers, Northeastern Montana, October 24-25, 1970: U.S. Geological Survey Open-File Report 80-1210, 16 p.
- Lee, R.W. 1980. Geochemistry of Water in the Fort Union Formation of the Northern Powder River Basin, Southeastern Montana: Helena, Montana, U.S. Geological Survey Water Resources Investigation 80-336, 17 p. 2 plates.
- McKinley, P.W. 1979. Water Quality of Selected Streams in the Coal Area of East-central Montana: U.S. Geological Survey Water Resource Investigation 78-142, 49 p.

Stoner, J.D. and B.D. Lesis. 1980, Hydrology of the Fort Union Coal Region, Eastern Montana: U.S. Geological Survey Map 1-1236.

Water Rights Bureau Field Office, Montana Dept. of Natural Resources and Conservation, Glasgow, MT.

SOILS

U.S. Department of Agriculture, Soil Conservation Service. "Soil Series Descriptions and Interpretations."

U.S. Department of Agriculture, Soil Conservation Service, Soil Survey Staff. "National Soils Handbook."

U.S. Department of Agriculture, Soil Conservation Service. 1976. "Dawson County Soil Survey, Montana."

VEGETATION AND AGRICULTURAL PRODUCTION

Dawson County Conservation District. 1975. Long Range Program for Resource Conservation and Development.

Killingbeck, K.T. and E.J. Crompton. 1978. Determination of Appropriate Sites for Coal Mining Operations: The Role of Endangered Plants and Critical Habitats. Presented at the International Congress for Energy and Ecosystem (Pergamon) Ecology and Coal Resource Development Conference in Grand Forks, North Dakota, June 12-16, 1978. Volume 1 page 386 (10).

Montana Water Resources Board. 1970. Water Resources Survey-Dawson County, Montana.

Oosting, J.J. 1956. The Study of Plant Communities.

Payne, G.F. 1973. Vegetative Rangeland Types in Montana. Montana Agricultural Experiment Station Bulletin 671.

U.S. Department of Agriculture, Soil Conservation Service. 1976. Climax Vegetation of Montana Based on Soils and Climate.

U.S. Department of Agriculture, Soil Conservation Service. 1976. Dawson County Soil Survey.

U.S. Department of Agriculture, Soil Conservation Service. 1976. National Range Handbook.

U.S. Department of Agriculture Soil Conservation Service. 1977. A Guide to Range Site Condition Classes and Recommended Stocking Rates in the Eastern Sedimentary Plains of Montana 10-14 inch Precipitation Zone.

U.S. Department of Interior, Bureau of Land Management. 1978. Glendive Planning Unit Resource Analysis.

SUMMARY MATRIX BURNS CREEK TRACT Resource and Environmental Considerations

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Topography	Flat-topped gently sloping ridges.	Topography would be less contrasting, with the original drainage patterns being reestablished.	Very Low	Good	
Geology	Tract is underlain by formations that are prospectively valuable for oil and gas. There are no known wells on the tract.	None	None	Acceptable	
	Tract containing 535.9 million tons of coal.	Loss of 59.5 million tons of coal for future use by current recoverable techniques.	Low	Good	
Soils and Reclamation Potential	There are 29 soil series in the tract mapped at level two in a survey done by Soil Conservation Service which are found along sedimentary plains and high terraces on uplands.	There will be displacement of soil by water and wind erosional forces; change in soil structure and natural fertility problems in revegetation and stabilization on steep slopes.	Significance of the impact will be high. Reconstruction potential is rated as 62% poor and suitability of soil material for reclamability is rated as 58% fair and 4% unsuitable.	Data reliability is 40 percent from the Dawson County Soil Survey for rangeland and 60 percent reliable for the bottomlands.	The better soils in the bottomlands were more accurately mapped than those on the rangelands and steep-sided slopes.
Hydrology Surface Water Quantity	The tract is drained mainly by tributaries to the South Fork Burns Creek, which flows in response to thunderstorms and snow melt. Annual yield from the South Fork Burns Creek upstream of the tract is 915 ac.ft. Yield from within the tract is estimated to be 540 ac.ft.	No significant impact is anticipated.	Very small	Fair-good	
Quality	During low flows, dissolved solids concentration are probably in the range of 1000 to 3000 mg/l. with sodium, sulfate, and bicarbonate the dominant ions. During high flow, dissolved solids concentration would probably be 200 to 600 mg/l. and the water a calcium bicarbonate type.	No significant impact is anticipated.	Very small	Fair	Dissolved solids concentration estimated, no field samples taken for chemical quality.

SITE SPECIFIC ANALYSIS

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Surface Water Alluvial Valley Floors and Flood Plains	The portion of South Fork Burns Creek which flows through the northeast corner of the tract has potential of being an alluvial valley floor.	Change in stability of channel if mined.	Possibly significant if channel is mined.	Good	
Ground Water Use in Tract	11 stock wells and two domestic wells lie within the tract. All are developed in the Alluvium or Tongue River aquifers.	All wells will need to be redrilled if needed following mining. Domestic wells would probably need to be completed in deeper aquifers to obtain comparable water.	Minimal cost for mining company to redrill wells.	Good	Well locations obtained from USGS & State of Montana inventories. Number of actual existing wells may be different than inventories.
Quantity	Natural groundwater flow in near-surface aquifers is to the southeastward, toward the Yellowstone River. Water in deeper aquifer flows northeastward in the direction of dip of the aquifer. Yields range from 2 to 25 GPM.	Water needed for industrial use in the mining operation could probably be provided by seepage water. Mining could cause lowered water levels in 11 wells outside the tract boundaries.	Possibly significant in nearby wells used for domestic supplies.	Good	Existing wells in tract will probably have to be re-drilled into deeper aquifers to obtain comparable quantity.
Quality	Dissolved solids for wells in tract range from 700 to 2500 mg/l. The water is a sodium sulfate type.	Mining could cause degradation of chemical quality of the groundwater in eight nearby wells.	Possibly significant in nearby wells used for domestic supplies.	Good	
Vegetation Rangeland Types: Prairie Co. Grassland with influences from the Badlands Grassland	Native vegetation covers 14,599 acres of the tract. Use of the tract is primarily livestock oriented with a few cash croplands. Vegetation provides food and habitat for wildlife; retards streambed and wind erosion and has beneficial impacts on air & water quality.	Kinds of vegetation and acres to be disturbed: Grassland 8,266 Sagebrush 4,549 Badlands 1,158 Upland Hardwoods 316 Riparian 252 Shadscale 58 Total 14,599	High, due to long-term elimination of established plant communities and reduction of species.	Data reliability is 95% from the Dawson Co. ASCS Committee. Reliability of data determined by cross-checking data received. There is no data at present that lists the kind or numbers of non-game species on the tract.	Many native species may be lost through mining. Impacts may be lessened by immediately respreading topsoil.
Livestock Forage in Animal-Unit-Months (AUMs) (Dawson Co. Average)	Average Production is 2,847 AUM's.	Average annual loss of 71 AUMs. Each acre would be out of production from 10 to 15 years. Maximum loss for any one peak mining year would be 3,650 to 5,548 acres and 712 to 1,082 AUMs.	Moderate to high depending upon individual operation. Low to moderate for overall tract.	Grazing data from Dawson Co. Conservation District Long Range Program Circa 1975. Recently, some croplands were seeded to grass.	

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Threatened or Endangered Plants	There are no reports of threatened or endangered plant species on the tract.	Low	Low	Good	No plants in MT. have been accepted as yet by the FWS for inclusion on the Threatened or Endangered Plant List
Noxious Weed Species	There are 4 noxious weeds found growing in the Richland-Glendive planning unit. None have been reported as being on the tract. The plants are: A. Canada Thistle B. Leafy Spurge C. Cocklebur D. Field Bindweed	Low	Low	Data obtained from the Richland-Glen dive Planning Unit Documents developed in 1978.	The impact depends on whether mining operations disturb noxious weeds before or after seed has been produced, and how topsoils containing noxious plant roots are handled.
Agriculture	There are 1,717ac. of land in the tract that are currently being cropped. The irrigated lands are found adjacent to the bottomlands.	Average annual loss of 24 acres excluding 533 total acres of summer fallow. Annual production on this 24 acres would be 682 bu. of wheat. Maximum loss in any one peak mining year would be 239 to 364 acres and 6,788 to 10,338 bu. of wheat.	Moderate to high depending upon individual operation. Low to moderate for overall tract production.	Data reliability is 95% from the Dawson County AG. Stabilization and Conservation Committee. Reliability of data determined by cross-checking data received.	
Land Use	No industrial activity. Farming is primary use. Little or no ranching. Six residential homes.	Introduction of industrial activities. Land required for mines, roads, railroads, and powerline rights-of-way. Land required for housing.	Moderate during mining. Low to none after reclamation.	Good	Existence of power lines, rail lines, and industry may encourage further development of area.
Recreation	No development or known uses of area. Hunting by permission only. Co. road does pass through tract.	None on site. Most of the impacts will occur off-site.	None	Poor	Recreation data (research) does not exist for this area.
Wildlife Threatened & Endangered Species	None known to occur, very limited information.	If present, significant, if not, insignificant.	If present, significant; if not, insignificant	Poor, very little available.	Wildlife inventories must be completed or received from Mobil Oil to apply unsuitability criteria or tract cannot be leased.
Woody Draws	Many on tract, exact location not known.	Destruction of essential habitat, especially for sharptail grouse.	If declared unsuitable, insignificant, if not, significant long-term destruction of essential wildlife habitat. Would reduce wildlife recreation in the area.	Very little information. Excellent in that woody draws are present and are essential.	Same as above plus reclamation of woody draws not yet proven.

SITE SPECIFIC ANALYSIS

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Native Prairie	Most of tract is native prairie.	Short-term destruction of native prairie. Especially important when accompanied by woody draws (see above).	Moderately significant-negative. Short-term reduction of sharptail grouse, other wildlife species and wildlife recreation.	Same as woody draws.	Reclamation possible within limits.
General					Increased poaching and disturbance would significantly reduce all wildlife populations in the region. If not controlled it would significantly reduce recreation opportunities.
Cultural/Historical Values	Tract not inventoried to date. BLM sponsored inventory scheduled for 1981. Expected prehistoric resources include lithic scatters (70-80%), stone circles, (10-20%), ceramic bearing sites, rockshelters, kill-sites (10% combined). Expected historic resources include homestead and ranch remains (50%), historic rock art (20%) freight roads, dugouts, cairns, trading posts, burials and battle sites (30% combined).	Direct impact to all cultural resources in the tract through damage and destruction and increased erosion, access and vandalism.	Damage and destruction to sites, artifacts, their immediate environmental context and the data these contain.	Good to excellent.	Expected resources in tract have been extrapolated from the literature on reported sites in the Fort Union KRCAs and inventory surrounding the Fort Union Region (BLM unpub., Davis, 1976; Greiser, 1980; Johnson, 1977; Reeves, 1970).
Wilderness	N/A	None	None	N/A	N/A
Visual Resource Management	Mostly a complicated drainage system into Burns Cr. Very rough terrain; lots of coulees & exposed soil. Vegetation limited to grasses/shrubs.	Disturbance of physical landscape is unavoidable. Other visual intrusions would include: Bldgs, roads, power lines, equipment, traffic.	Short-term - high Long-term - low	Fair	Very difficult to mitigate visual impacts during mining effort. Successful reclamation would mitigate major problem.
Net Energy Analysis	6,750 btus/lb.	The ratio of energy expended to that energy produced is 1 btu to 179 btus.	None	Acceptable	
Air Quality	Excellent	Minimal background addition. All standards will be met except the 24-hr. PSD standard for TSP may be violated at least one time per year under certain conditions.	Could be significant	Fair	

Economics and Social Conditions

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Population/ Employment	Population and employment levels are forecasted to be relatively stable through the year 2000.	Communities of Glendive, Circle, Sidney, Savage, Fairview and Lambert would experience population and employment increases.	Population/employment increases in these communities are of low to moderate significance.	Good	See population and employment graphics in Chapter 3 for more detail.
Regional Personal Income	Regional personal income is forecasted to increase moderately.	Slight increases in regional personal income from tract construction and operation.	Insignificant	Fair	
Infra- structure	Most services are currently adequate or barely adequate in Sidney, Savage, Glendive, Circle, Fairview and Lambert.	These six communities would all have one or more public services which would become inadequate as a direct result of tract development.	Moderate to high impacts: Glendive's water supply situation and Sidney's fire protection would become inadequate as a result of tract related population growth. Low to moderate significance in remaining communities.	Excellent	See community service graphics in Chapter 3 for greater detail.
Resident's Perception of Community Services (Chapter 2 only)	Service problems: Richland County a) traffic & roads b) medical care c) recreation/ entertainment. Dawson County a) medical care b) recreation/ entertainment.	Not Applicable	Not Applicable	Good	
Social Attitudes (Chapter 2 only)	Majority of respondents in Dawson and Richland counties support (with conditions) coal development.	Not Applicable	Not Applicable	Good	
Quality of Life	General satisfaction in Dawson and Richland counties.	Some slight deterioration.	Insignificant	Good	

BURNS CREEK TRACT UNSUITABILITY CRITERIA RESULTS

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	Applied	N/A	N/A	No federal land systems found within the tract.
2. Rights-of-way and easements	Applied	None	None	Applied to Federal surface and/or private surface over federal coal.
3. Buffer Zones	Pending	N/A	Yes	Requires agreements w/local governments and private owners of dwellings.
4. Wilderness study areas	Applied	N/A	N/A	No wilderness study areas found within tract.
5. Scenic areas	Applied	N/A	N/A	No scenic areas found within tract.
6. Land used for scientific studies	Applied	N/A	N/A	No lands used for scientific study were found within the tract.
7. Cultural and historical sites	Pending further study	N/A	Yes	Applied upon completion of inventories (Dec., '81)
8. Natural areas	Applied	None	None	No designated natural areas within the tract.
9. Federally listed endangered species	Pending further study	N/A	Yes	To be applied in Dec. '81.
10. State listed endangered species	Pending further study	N/A	Yes	To be applied in Dec. '81.
11. Eagle nests	Pending further study	N/A	Yes	To be applied in Dec. '81.
12. Eagle roosts and concentration areas	Pending further study	N/A	Yes	To be applied in Dec. '81
13. Falcon cliff-nesting sites	Pending further study	N/A	Yes	To be applied in Dec. '81
14. Migratory birds	Pending further study	N/A	Yes	To be applied in Dec. '81

SITE SPECIFIC ANALYSIS

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
15. State resident fish and wildlife	Pending further study	N/A	Yes	To be applied in Dec. '81
16. Flood plains	Applied	None	None	No significant flood plains were found within the tract.
17. Municipal watersheds	Applied	None	None	No municipal watersheds were found within the tract.
18. National resource waters	Applied	None	None	No national resource waters were found within the tract.
19. Alluvial valley floors	Applied	N/A	None	No drainages within the tract qualify as AUFs.
20. State proposed criteria	Applied	None	None	No State criteria

PRELIMINARY FACILITY EVALUATION REPORT

8

GOALS AND OBJECTIVES

The purpose of this report is to provide a preliminary evaluation of the facility's current state and to identify areas for improvement. The report will be used to guide the development of a comprehensive facility evaluation and to inform the decision-making process regarding future facility improvements.

The report will focus on the following areas:

- Facility layout and design
- Equipment and machinery
- Personnel and training
- Materials and supplies
- Costs and budget

The report will provide a detailed description of the facility's current state and will identify areas for improvement. The report will also provide recommendations for future facility improvements and will provide a timeline for the implementation of these recommendations.

The report will be used to guide the development of a comprehensive facility evaluation and to inform the decision-making process regarding future facility improvements. The report will provide a detailed description of the facility's current state and will identify areas for improvement.

The report will provide recommendations for future facility improvements and will provide a timeline for the implementation of these recommendations. The report will be used to guide the development of a comprehensive facility evaluation and to inform the decision-making process regarding future facility improvements.

The report will provide a detailed description of the facility's current state and will identify areas for improvement. The report will also provide recommendations for future facility improvements and will provide a timeline for the implementation of these recommendations.

The report will be used to guide the development of a comprehensive facility evaluation and to inform the decision-making process regarding future facility improvements. The report will provide a detailed description of the facility's current state and will identify areas for improvement.

The report will provide recommendations for future facility improvements and will provide a timeline for the implementation of these recommendations. The report will be used to guide the development of a comprehensive facility evaluation and to inform the decision-making process regarding future facility improvements.

The report will provide a detailed description of the facility's current state and will identify areas for improvement. The report will also provide recommendations for future facility improvements and will provide a timeline for the implementation of these recommendations.

The report will be used to guide the development of a comprehensive facility evaluation and to inform the decision-making process regarding future facility improvements. The report will provide a detailed description of the facility's current state and will identify areas for improvement.

PART I

Assessment of the Facility

The purpose of this section is to provide a detailed description of the facility's current state and to identify areas for improvement. The report will provide a detailed description of the facility's current state and will identify areas for improvement.

PRELIMINARY FACILITY EVALUATION REPORT

Facility Description

The purpose of this section is to provide a detailed description of the facility's current state and to identify areas for improvement. The report will provide a detailed description of the facility's current state and will identify areas for improvement.

The report will provide recommendations for future facility improvements and will provide a timeline for the implementation of these recommendations. The report will be used to guide the development of a comprehensive facility evaluation and to inform the decision-making process regarding future facility improvements.

The report will provide a detailed description of the facility's current state and will identify areas for improvement. The report will also provide recommendations for future facility improvements and will provide a timeline for the implementation of these recommendations.

PRELIMINARY FACILITY EVALUATION REPORT

GOALS AND OBJECTIVES

The Fort Union Regional Coal Team, in its consideration of leasing federal coal, will address the likely coal end-uses and their implications. The purpose of evaluating how the coal will be used is to present the most probable major impacts of development.

The end-use facility evaluations are at a reconnaissance level and the reports are presented only as general approximations of facility characteristics and impacts.

The uncertainty of actual end-use facilities and the inherent problems in defining a "typical facility" limit end-use analysis to broad generalizations. The evaluations are not meant in any way to substitute for detailed site specific evaluations, EISs, or analyses which come later when mining and facility projects are actually proposed. The end-use facility evaluations will not preclude any federal, state, local, or private decisions concerning actual end uses, facility siting, or end-use restrictions. The end-use reports are meant only to provide additional information to be used in decisions concerning the leasing of federal coal in the Fort Union Region and should not prejudice any later decisions.

End-use evaluations, referred to as preliminary facility evaluation reports, have been prepared for those tracts for which a new coal-use facility is expected to be built. One of the three proposed end-use facilities has been assigned to those tracts based on expressions of interest, tract size, or existing facilities. The typical facilities to be considered are: a 250 million standard cubic feet per day gasification plant; a 1,000 megawatt electric power generation plant; and an 85,000 barrel per day indirect coal liquefaction plant.

Part I of the report summarizes what the assigned typical end-use facility might be like. The description of the facility gives plant size, process technology, plant requirements (fuel, land, water, power), emissions, and other characteristics of facilities likely to be proposed in the Fort Union Region. The description includes ancillary facilities and a discussion of construction and operational aspects of the facility that are relevant to determining impacts that could occur in the vicinity of the tract.

The facility description is based on existing analyses, studies, environmental impact statements, and consultation with State and industry representatives. Part II of the facility report is an analysis of the facility impacts on the tract area.

The preliminary facility evaluation reports will be used by the Regional Coal Team to rank federal coal tracts with a better understanding of likely future development impacts and implications.

PART I

Assumptions and Variables

The typical indirect liquefaction facility characteristics based on numerous assumptions and reasonable values for important variables. Some of the assumptions and variables are based on best estimates. Others are based on existing literature, facilities, and on input from industry sources.

Facility Location, Type, and Size

Because of the economics of lignite coal, it was assumed in the early stages of the Fort Union coal leasing process that the end-use facilities would be near the tracts to be leased. The energy value of lignite coal as well as the water content make the transporting of lignite for long distances uneconomical. For purposes of issue level impact analysis, the indirect liquefaction facility assigned to the Burns Creek tract is not specifically located but assumed to be near the tract. Such an assumption will eliminate the problems of arbitrarily siting facilities. Facilities were sited, however, for the air quality modeling. Where specific site location information was available from potential project developers, it was used in the facility analysis. The generic indirect liquefaction facility would produce 85,000 barrels per day of methanol. The plant would use the Lurgi gasification process. The synthetic gas would then be converted to methanol. Based on industry proposals for liquefaction facilities, this indirect liquefaction process of coal to gas to methanol will be the prevalent process used in the region for at least the next 10 to 15 years. Many of the assumptions concerning indirect liquefaction are based on the Nokota Company's proposed methanol plant.

Construction Period

The construction time span for a synfuel facility can vary greatly. A company hiring four to five thousand construction workers could complete the proposed facility in as short a time span as three years. A company could choose to lengthen the construction period or build parts of the plant capacity in two or more construction phases. This would reduce the construction work force and spread construction over as many as ten years.

The assumption is that the typical facility will be constructed in phases. The typical indirect liquefaction facility will be assumed to have a two phased construction period with each phase lasting four years. The construction of one phase would result in partial plant

capacity in operation earlier, enabling the company to generate an early return on their investment. Construction of one phase should provide the company with technical information, enabling them to make modifications in the second phase.

Employment

The construction work force will be a function primarily of the construction schedule. Work force numbers were supplied by the Nokota Company. While the Dunn-Nokota Methanol Plant is scheduled for a five-year construction period, the generic methanol facility will have the same construction schedule and work force as the generic gasification plant.

Water Requirements

Water demands for an indirect-liquefaction facility depend on production technology, operation time, and water quality. The values used for water requirements are based on estimates from Nokota. The value for gallons per minute is an estimate of average water use for the facility. The yearly requirements are an approximation based on an operation factor assumed for the facilities. This operation factor indicates the time the facility will be in operation each year.

For analysis purposes, water for the methanol plant is assumed to come from the Fort Peck Reservoir.

Emissions

The air emissions for the methanol plant will depend primarily on the facility's production process, the amount and quality of coal burned, the level of pollution control, and whether or not the facility produces its own electric power.

An important assumption is the source of a facility's electric power. The proposed generic facilities would require from 100 to 150 Megawatts of electric power for peak plant operation. It will be assumed that the indirect liquefaction facility will produce its electric power on the plant site with coal-fired boilers and steam turbines.

An assumption affecting air emissions from a generic facility is the quality of the coal. The sulfur, ash, and water content of the lignite will not only influence emissions per ton of coal burned, but will also determine the amount of coal required for a given facility. The amount of coal required for a generic indirect liquefaction facility could vary from 11 to 14 million tons per year depending on the coal quality and certain process characteristics.

The air emissions from any type of coal conversion facility will be a function of the conversion process characteristics and the emission control technology used at the facility and the level of control used. The possible variation is evident when the emission rates for

the Great Plains Coal Gasification and Nokota facilities are compared. The two facilities will produce approximately equivalent amounts (BTU values) of gas and methanol. The emissions for the two facilities are expected to vary considerably, due to the difference in the level of emission control planned for each facility.

The impacts resulting from air contaminants emitted by the coal end-use facility are deduced by using established air quality standards above which deleterious effects of the contaminants are implied to occur. A facility's ability to meet air quality standards assumes there would be no significant deleterious effects to human health, animals or vegetation. Such an assumption is the subject of continuing discussion and is disputed by certain research studies. A more detailed discussion of this issue can be found on pages 37-94 in the Final West-Central North Dakota Regional Environmental Impact Study on Energy Development (October 1978). The facilities could also emit certain pollutants for which there are no standards. The anticipated levels of air quality concentrations of contaminants are obtained by measuring existing levels of air quality and adding computer simulation of the atmosphere loading resulting from the end use facility.

The air quality impacts are considered in terms of ambient air standards and prevention of significant deterioration standards. Under authority of the Clean Air Act of 1970, the State of Montana has promulgated its own ambient air quality standards. The purpose of the Montana Ambient Air Quality Standards is to control the quality of the air over Montana such that a) the health of sensitive and susceptible segments of the population will not be adversely affected; b) concentration of pollutants will not cause public nuisance or annoyances; c) significant damage to animals, ornamental plants, forest and agricultural crops will not occur; d) visibility will not be significantly reduced; e) metals or other materials will not be significantly corroded or damaged; f) fabrics will not be soiled, deteriorated, or have their colors affected; and g) natural scenery will not be obscured. Montana's ambient air standards are generally more stringent than the federal EPA standards, and they include a number of criteria for which there are no EPA standards, such as visibility (Class I areas only), hydrogen sulfide, and fluoride.

Under authority of the Clean Air Act Amendments of 1977, Prevention of Significant Deterioration (PSD) standards apply to all areas that are in compliance with federal standards for particulate matter and sulfur dioxide. PSD establishes three air quality classes. Class I areas allow only a small incremental increase in pollution beyond existing conditions in the area at the time of designation. The bulk of the United States was designated Class II, which allows for well-planned growth and some additional pollution, although within limits that are well below the standards. Class III applies to areas of industrial growth and permits incremental increases in pollution up to, but not exceeding, the standards. Since

1974, Congress, the states and Indian tribes have been eligible to petition EPA to classify areas Class I and Class III, providing that various specified procedures are followed. Wilderness and certain other specially managed areas in existence before August 1977 received automatic Class I designations, and the Northern Cheyenne Tribe requested and received Class I status for its reservation in mid-1977.

The federal Clean Air Act states that pollutants originating in Canada are to be included in calculating the existing air quality of neighboring regions of the United States for purposes of enforcing the PSD standards, unless the governor of a state takes action to exclude such pollutants.

After March 1979, the states were to be responsible for administering the PSD regulations and for processing redesignation petitions. However, due to changes in the federal rules, PSD delegation for Montana has not yet been approved. The Air Quality Bureau is presently evaluating procedural alternatives for PSD administration.

An in-depth analysis of air quality impacts resulting from facilities associated with certain coal lease tracts was impossible. Discussion of site specific impacts without addressing the interactive and cumulative impacts would have little decision value. For the purpose of this analysis, the end use facility which has been assigned to the coal lease tract will be discussed. This discussion will contain general statements regarding facility impacts on the air quality. The impact analysis is based on standard dispersion computer modeling using the worse case situation. The analysis is in terms of compliance or noncompliance with ambient air quality standards or PSD standards. A limited analysis of this type cannot be substituted for a detailed permit review. Care must be taken to use this information with the proper qualifiers and should not be taken out of context.

Solid Wastes

Estimates of solid wastes from the facility are based on figures from Nokota. Estimates for ash and sludge could vary considerably depending on the ash content of the coal and the pollution control technology used. Planned facilities are proposing to dispose of solid wastes in the nearby mines.

INDIRECT LIQUEFACTION FACILITY

Introduction

The typical lignite coal liquefaction plant would use an

indirect liquefaction process to produce methanol from synthetic gas. The facility would produce an average of 85,000 barrels of methanol and 3,000 barrels of gasoline blending stock each day. The indirect liquefaction complex situated near its coal source, would consist of the following major units: 1) coal preparation, storage, and handling; 2) gasification units; 3) methanol synthesis units; 4) process facilities; 5) pollution control facilities; and 6) ancillary facilities. See figure 1.

The plant layout for an indirect liquefaction facility would be very similar to that described for coal gasification. The only major difference would be the addition of methanol synthesis units which would require no significant additional space.

The total land area dedicated to the indirect liquefaction plant site would be about 960 acres. Major structures would include: 1) gasifiers/methanol synthesis units; 2) coal preparation facilities; 3) boiler plant; 4) boiler stack; 5) compression building; 6) other buildings - administration, shops, warehouse; 7) ponds for clarified water storage, process water, and storm water catch basin; and 8) distillation and absorption columns.

Lignite received directly from the nearby mine by truck or conveyor would be crushed, sized, and sent to storage piles. When needed, the coal would then be resized, weighed, and sent by conveyor either to the gasification unit or to the steam generation area. The supporting utilities would include steam generation and distribution, power generation and distribution, oxygen production, raw water supply and water treatment, and fire protection. The wastewater treatment system would be designed for maximum reuse within the plant. No wastewater would be discharged to surface waters. Gaseous waste streams would be treated prior to discharge from a 500-foot stack. Waste solids from coal processing, wastewater treatment units, and from the ash handling system would be dewatered and disposed of at the mine. By-products would be recovered, stored, and either consumed in the plant or sold. Water from a nearby source would be used in the gasification process, in steam generation, in cooling, and for plant utility and sanitary purposes. There would also be a product pipeline to transport the methanol away from the facility.

Employment

The construction of an indirect liquefaction facility would be completed in consecutive phases. Phased construction would involve building one half of the plant's capacity in about four years followed by a four-year construction period for the second half. Construction employment will peak late in the third year with approximately 3,000 workers. Table 1 shows average yearly employment. Once the facility is in full operation, it would employ about 900 workers.

Figure 1

METHANOL SYNTHESIS

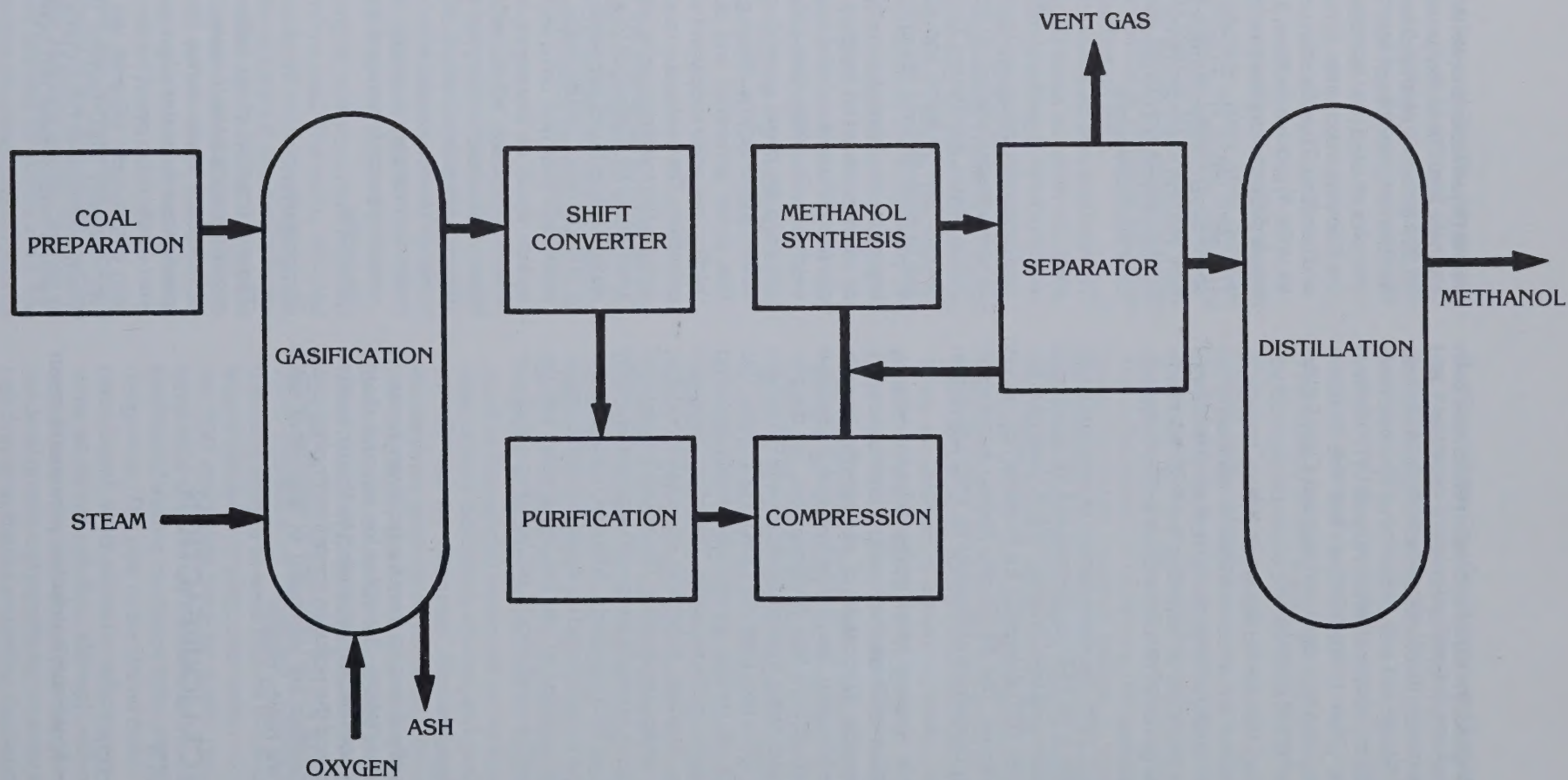


TABLE 1
AVERAGE YEARLY EMPLOYMENT

Year	1	2	3	4
Construction	230	1376	2617	2192
Permanent			440	580
	5	6	7	8
	567	1388	2094	1317
	580	580	580	900
				etc.

SOURCE: American Natural Resources Company, the Nokota Company.

Coal Preparation, Storage, and Handling

After crushing, weighing, and sampling, the lignite coal would be conveyed to either an active or inactive storage pile. The inactive storage pile would amount to a 30-day supply and would only be used during extended shutdowns in the mine. The live storage pile would feed the plant on a day-to-day basis. The indirect liquefaction plant would require approximately 14 million tons of coal to be mined each year. See figure 2.

Gasification Process

The gasification/methanol process uses the same gas production technology as the gasification facility. In the gas production section, coal, steam and oxygen are reacted under conditions of controlled temperature and pressure to produce a crude gas containing methane, hydrogen, carbon monoxide, carbon dioxide, excess steam and various by-products and impurities. Before leaving the gas production section, the hot crude gas is cooled and scrubbed to partially remove impurities. The ash is sent to disposal. The crude gas from the gas production section is split into two streams. One stream is sent to the shift conversion section. The other stream bypasses the shift conversion section and is sent to the gas cooling section. The shift conversion section adjusts the hydrogen-carbon monoxide ratio in the crude gas stream. The shifted gas is then also sent to the gas cooling section. In addition to lowering the temperature of these two gas streams before they are combined, the gas cooling section also removes more by-products and impurities from the feed streams for processing in the gas liquor section. The combined gas streams are sent to the gas purification section which removes naphtha and acid gases (carbon dioxide and hydrogen sulfide). The stream is then sent to the methanation section. The function of the methanation section is to upgrade the heating value of the gas feed stream from the gas purification section. The upgraded synthesis gas is then passed once more through the gas purification section.

The methanol synthesis unit produces 85,000 barrels per day of methanol using the Lurgi methanol process. The gas is combined with recycle gas and heated to the reaction temperature then fed to the methanol converter. The converter effluent is cooled, and the liquid

methanol, separated from the gas, is sent to the drying section where the water content is reduced.

Process Facilities

The main boiler plant for the gasification facility would generate steam to drive turbines for electric power generation, to drive compressors and large pumps and to supply process steam for coal gasification. A 500-foot stack would disperse flue gases from the steam boilers, the super heater, and other heaters. Steam generated in the high pressure boilers will power extraction condensing turbines driving the three air compressors in the oxygen plant. The steam from the air compressor turbines will be combined with steam generated in the methanation waste heat boilers. This steam will then be supplied to the gasifiers and to the turbine drivers. Average operating electric power requirements would be approximately 150 megawatts. The oxygen facilities would provide gaseous oxygen to the gasification process.

Raw water would be piped in from a nearby water source. Pump capacity would be installed to meet the normal plant operating requirements of approximately 7,800 gallons per minute. The facility would require approximately 11,500 acre feet of water each year. Raw water entering the plant will be processed in a clarifier. Water not sent to the cooling towers will be filtered further for plant use.

Emission and Pollution Control

The two principal sources of gaseous effluents at the facility - gaseous waste streams from the gasification methanol process and the combustion flue gas streams - will be treated to reduce the concentrations of SO₂ with a scrubbing system and particulates with electrostatic precipitators. Gaseous streams containing hydrocarbons will be incinerated. The steam boiler flue gas will be treated prior to being combined with the other gas streams for discharge via the common stack.

TABLE 2
AIR EMISSIONS (lbs/hr)

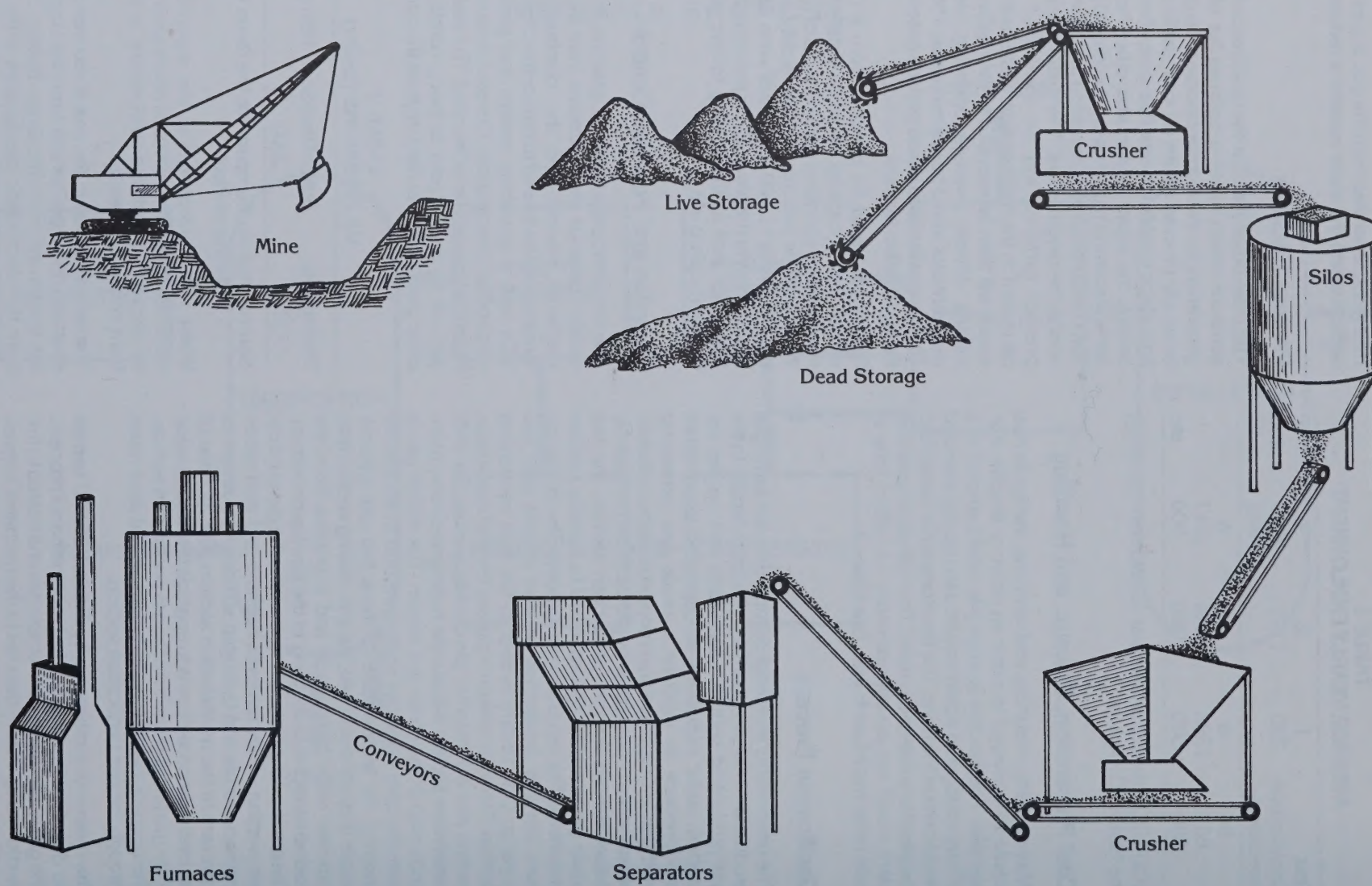
Particulates	Sulfur Dioxide	Nitrogen Oxides
230	2600	4420

Source: Nokota Company for the Dunn Center Methanol Plant.

Water will be recovered to the maximum possible extent for reuse. That which is not recovered will either be disposed of with the solid wastes or lost as vapor from cooling processes.

The ash contained in the coal is recovered from three sources: 1) the gasifier ash from the Lurgi gasifier; 2) the bottom ash from the steam boilers; 3) the fly ash from the electrostatic precipitators in the steam and electric power generation section. The gasifier ash and

Figure 2
COAL HANDLING SYSTEM



the boiler bottom ash are conveyed to the dewatering facilities which separate the ash and water. The dewatered ash, a free flowing solid containing 20 percent water, will be disposed of at the mine. The recovered water is recycled to the ash sluiceway. The fly ash is collected by electrostatic precipitators. This ash is sprayed with water to prevent dusting as it is withdrawn from the storage silo. It will then be disposed of at the mine.

TABLE 3
SOLID WASTE (tons/hr)

Dry Ash	Dry Sludge	Water
117	14	44

Source: Nokota Company for the Dunn Center Methanol Plant.

Ancillary Facilities

Suitable loading and unloading facilities would be provided to ship and receive materials by either pipeline, truck or rail. Storage would be provided in suitable closed tankage. There would be handling (and storage) facilities for the following major materials: methanol, caustic soda, sulfuric acid, propylene, phenols, gasoline blending stock, ammonia, sulfur, and creosotes.

A railspur would connect the facility with an existing rail system. The spur would have a 150-foot right-of-way. Rail loading and unloading facilities would be provided for by-products. The water pipeline will require a right-of-way 100 feet in width for construction and 50 feet wide permanently.

PART II

Relationship of Tract and Facility

The Burns Creek tract lies eighteen miles southwest of Savage in Dawson County, Montana. The tract consists of 16,330 acres of land with recoverable coal reserves of 535.8 million tons.

The likely use of coal mined from the tract would be for an indirect liquefaction plant. To consider the impacts of this coal facility, it is assumed that the typical indirect liquefaction plant described in Part I would be constructed adjacent to or near the tract with no specific site designated, except for purposes of air quality analysis.

Soils, Vegetation and Agriculture

In the Burns Creek tract area, the agricultural land consists of approximately 9 percent cropland, 1 percent hayland and 90 percent rangeland. Based on 1978-1979 county averages determined from ASCS

data and from BLM grazing files annual production per acre would average 28.4 bushels per acre of wheat, 1 ton per acre for hayland and .195 AUMs per acre for rangeland.

Assuming the same agricultural land use distribution for the 960 acre disturbance estimated for a generic indirect liquefaction facility, annual agriculture production foregone on the facility site would be 13,632 bushels of wheat annually, in a worst case situation analysis, for the life of the facility.

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur, also of undetermined length until final siting of the facility would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Erosion losses due to wind and water from ground disturbed during the construction phase of the facility, given State permitting stipulations, would not be significant. Regionally, the agricultural production foregone on the 960 acre facility site also would not be significant. Because of the highly-buffered soils in the tract area and downwind, no significant impacts to soils are expected from acid rains.

There is evidence documented in the literature (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978) that there are potential negative impacts to vegetation and to livestock downwind from such a facility due to nitrogen oxides, sulfur dioxide and particulate matter. Such negative impacts would be analyzed in detail at such a time as more specific information becomes available in conjunction with or to facility permit application with the State permitting authority.

Water

Water requirements for an indirect liquefaction facility are approximately 7,800 gallons per minute or 11,500 acre feet per year. The likely source of water for industrial use is Fort Peck Reservoir. Withdrawal of water would have no significant impact upon the reservoir. Facility wastes of ash, sludge and water disposed of in the mine do have the potential to degrade water quality if they are disposed of within the saturated zone which develops upon reclamation. Present regulations require state approval of disposal sites.

Land Use

Changes in land use include displacement of existing use, increased intensity of existing uses and the introduction of new uses. The site of the facility is likely to displace agricultural use.

The optimum site conditions for facilities are the same as for agriculture, that is: gentle topography and soils

with good drainage characteristics. The increase in population of communities results in demand for new housing, additional commercial development and expanded public use facilities. The area of this development will likely be on off-site agricultural land. The on-site displacement of agricultural land use is discussed in the Agriculture section of this report.

Increased population would create a demand for community services as addressed in the Economics and Social Conditions section of this report. This demand implies a need to expand existing facilities and commercial establishments or to create new ones. Existing commercial establishments may suffer through the construction of new facilities outside the downtown areas. Public services would be stretched in the short-term by lack of capital to implement change due to increased population. Parking shortages, traffic congestion and excessive wear and tear on roadways would make downtown areas less habitable. Municipal organizational structures and physical space may prove inadequate with increased population. For example: a part time mayor may be overworked, processing of permits may delay private building construction and filing space for public records may prove inadequate.

With the influx of workers and their families, a change in the composition of the community is inevitable and demands for new forms of public and commercial facilities for shopping, recreation, entertainment would ensue. These types of changes are likely to result in dissatisfaction by both the existing resident population and by the newcomers. Conflicts are likely to occur as a result of the contrast in the lifestyles of these populations.

Existing planning varies considerably from community to community. Some are prepared for change presaged by recent oil and gas development in some areas, while others are ill prepared for the change in population anticipated.

Current perception of county residents with regard to roads, retail opportunities, recreational/entertainment facilities and housing are discussed in detail in Chapter 2 of the Site Specific Analysis for Economics and Social Conditions.

Similarly, forecasts by city/county planners regarding likely changes in community services resulting from facility related population growth are presented in detail in the Economics and Social Conditions section of this report.

Recreation

Recreation in the tract vicinity is limited to dispersed seasonal sharptail grouse and big game hunting. Landowner consent is very difficult to obtain for access. Although there are no recreation facilities in the tract vicinity, existing recreation facilities in the region (community camping and picnic areas, Fort Peck

Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive the majority of recreation demand from the projected population increase. The social attitude survey revealed a concern for existing recreation facilities. It was stated that an increase in population would hopefully result in the possible upgrading of already marginal recreation facilities. This concern will be addressed with the expected recreation demand from increased population in the regional EIS. There is no wilderness in the area.

Wildlife/Fisheries

Impacts of an indirect liquefaction facility on wildlife in the Burns Creek tract area could occur in two areas: 1) impacts from destruction of habitat and 2) direct and indirect impacts from the increase in human population.

The removal of vegetation for a 960 acre methanol facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed.

Most of the surface landowners in the tract area will not allow BLM wildlife biologists on the land to conduct inventories. The area around the tract contains numerous woody draws.

If powerlines, pipelines, access and haul roads are constructed in key wildlife areas, partial or total destruction of habitat would occur depending on the magnitude of development. The worst case would destroy present wildlife populations in the area. Wildlife oriented recreation such as hunting and wildlife observation would have to be sought elsewhere. Wildlife would be impacted by eagle electrocutions on powerlines, migratory bird mortality from striking power lines close to wetlands, road kills along transportation routes through important wildlife areas, harassment of wildlife by off-road vehicle use, increased poaching, as well as habitat destruction.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming and Colorado where energy development has occurred. The problem is compounded in areas where transportation corridors are located in important wildlife areas and shift changes coincide with wildlife feeding periods. This situation could occur in the Burns Creek tract area.

The impact to wildlife could be mitigated by: 1) siting the methanol plant and associated facilities with regard for critical wildlife areas, 2) adjusting work shifts to avoid feeding times of highly visible wildlife, 3) mass transportation of employees, 4) providing funds to State fish and game agencies to better control illegal shooting of wildlife, and 5) adopting a poaching clause in union contracts.

Taking water from shallow bays in Fort Peck Reservoir could have significant adverse impacts. These areas

are prime nursery and spawning areas for sport, commercial and forage fish. Taking water from deeper non-critical areas of the reservoir could reduce or eliminate the significant impacts to fisheries.

The cumulative increases in industrial, urban and other water uses will dictate the severity of the impacts on fisheries. The cumulative impact will be addressed in the regional EIS to be prepared.

Cultural Resources

The Burns Creek tract area has not been inventoried to date. Information from existing inventories (BLM unpublished data, Davis 1976; Greiser 1980) outside the Fort Union coal region suggests that the predominant prehistoric sites should be lithic scatters of varying size, density and function (ca. 70-80%). Other expected prehistoric resources include stone circles (ca. 10%-20%), ceramic bearing sites, rockshelters and kill sites (ca. 10% combined). Expected historic resources include homestead and ranching remains (ca. 50%), historic graffiti and rock art (ca. 20%), freight roads, dugouts, cairns, trading pots, burials and battle sites (ca. 30% combined). Further information on cultural resource occurrence, distribution and significance cannot be quantified prior to inventory.

Visual Impacts

Eastern Montana has very high but common visual quality. In the absence of other types of visual experiences, the landscape is not highly valued as scenery because of the vast distances involved in crossing this relatively uniform area. Most highways roll with the landform so views alternate between nearby features at low points and panoramas of up to thirty miles at high points in the roadway profile. The landscape is seen in terms of these short vistas of landscape elements that will not be seen again, and short duration views of distant landscapes in which any vertical object or landscape feature serves as a focal point.

Large structural features in the Eastern Montana landscape contrast with the landscape both in terms of the visual surface (the character of what is seen) and in terms of function. Vertical and linear components of a facility, because of hard architectural edges of the structures, and the transitory nature of panoramic views imply a visual importance of these large objects for orientation. The aesthetic response is secondary to this visual function.

Neglecting cultural bias, the aesthetic response to stark architectural lines and pure planes of color contrasting with the simple curvilinear landforms of the countryside can be considered positive. This visual experience would be immediately comprehensible and would provide relief from a relatively uniform countryside. Beyond this initial response, however, are responses

with origins in cultural bias and the individuals' relationships to the land. The greatest effect would be upon local residents with memories of the existing landscape to use as a comparative basis of judgment. If no attachment to the existing landscape is present, the facility would be judged more on its quality than on cultural bias.

The visual impact would be the penetration of the skyline by the facility in views from communities and major transportation corridors. The 500-foot stack could potentially be seen thirty or more miles away. The facility would be highly visible and would demand a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape as it now exists for the forty years of the facility's expected life.

Economics and Social Conditions

Construction and operation of the Burns Creek Facility would result in impacts upon services in some communities within the areas as a result of population growth associated with employment opportunities. Figure 3 shows forecasted community employment and population levels through the year 2000 both with and without development of the facility. As these figures show, Glendive, Sidney, Lambert, Savage, Fairview, West Glendive, Richey, Lindsay, and Bloomfield would experience increases in both population and employment as a result of development.

Changes in regional personal income from facility development are expected to be insignificant through the year 2000. The communities in which the workers and their families reside would experience some increases in economic activity as a result of employee's payroll expenditure and through company expenditures for goods and services during the construction and operation phases. The Burns Creek facility is fore-

FIGURE 3

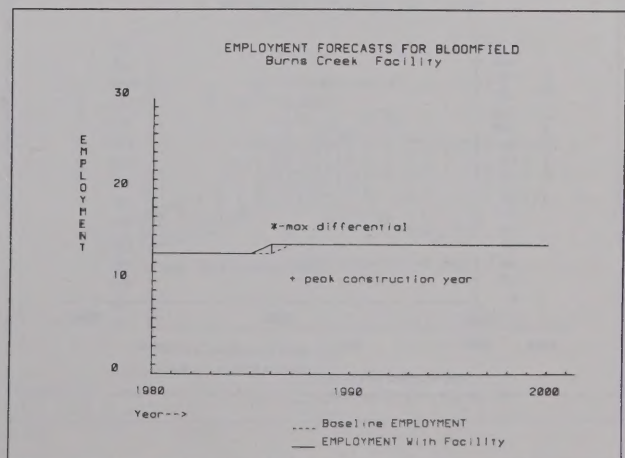


FIGURE 3 (continued)

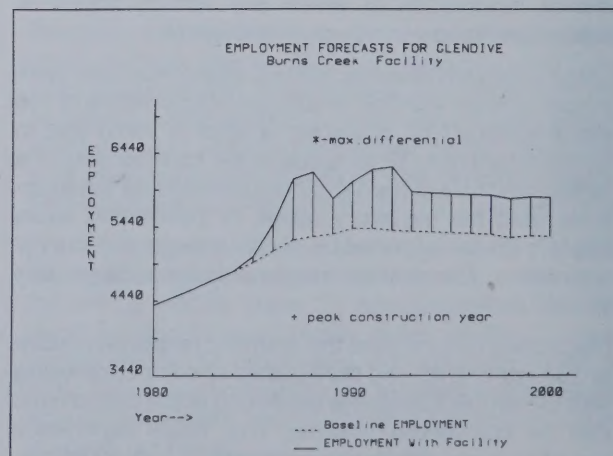
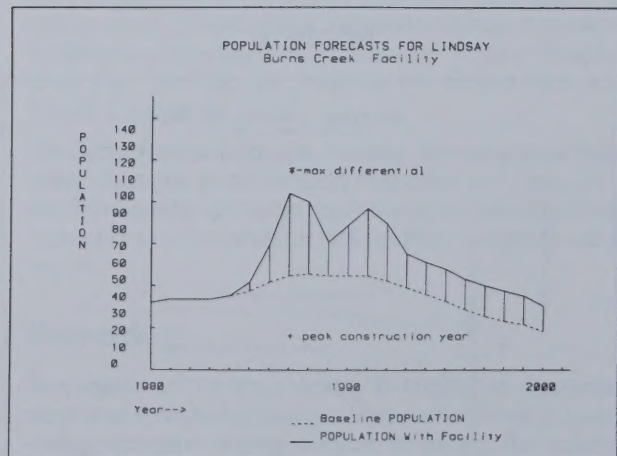
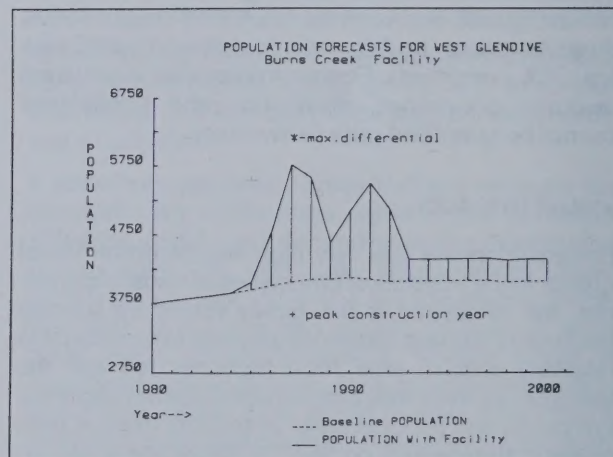
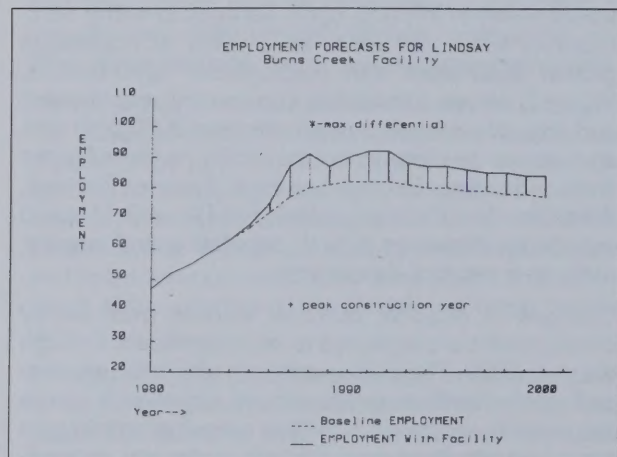
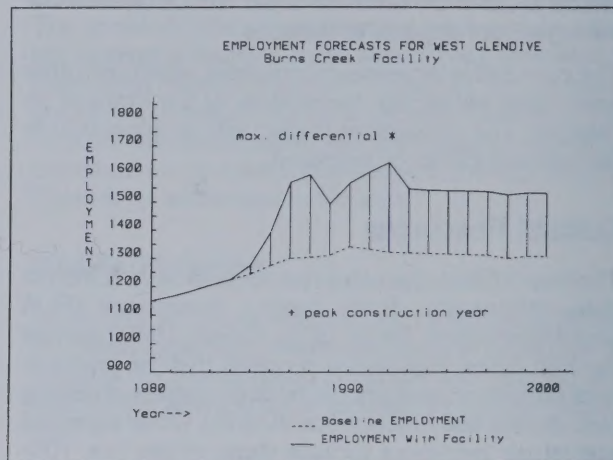
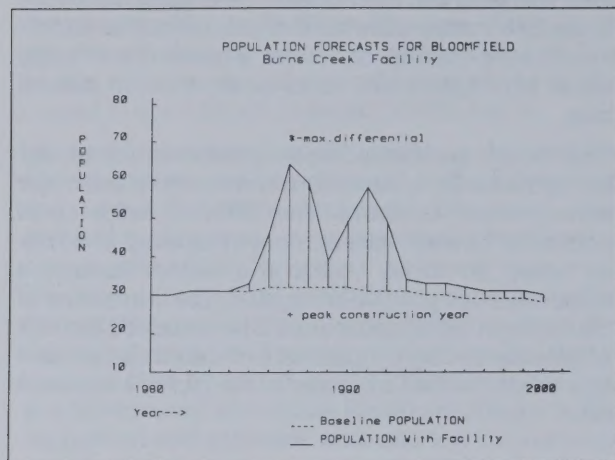


FIGURE 3 (continued)

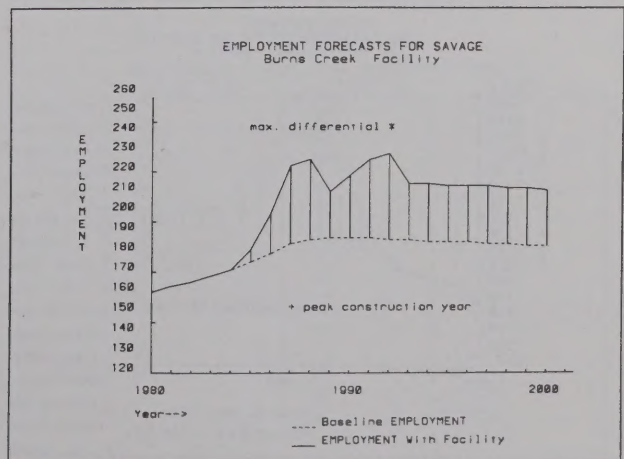
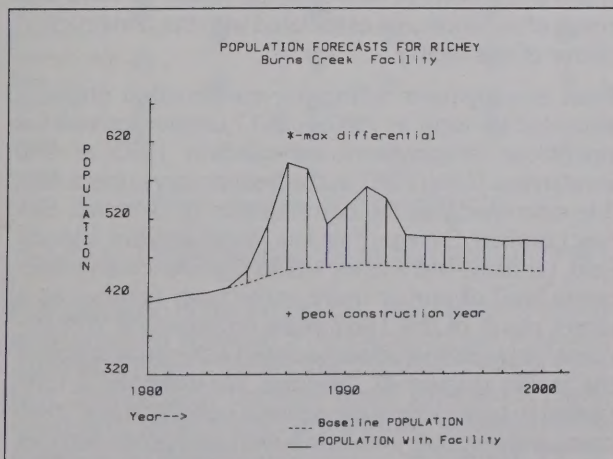
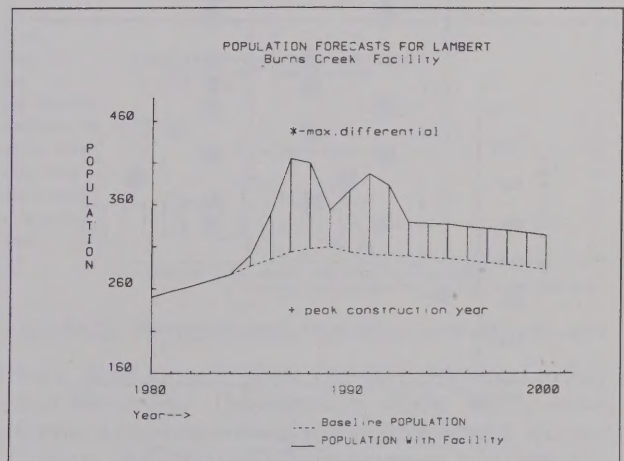
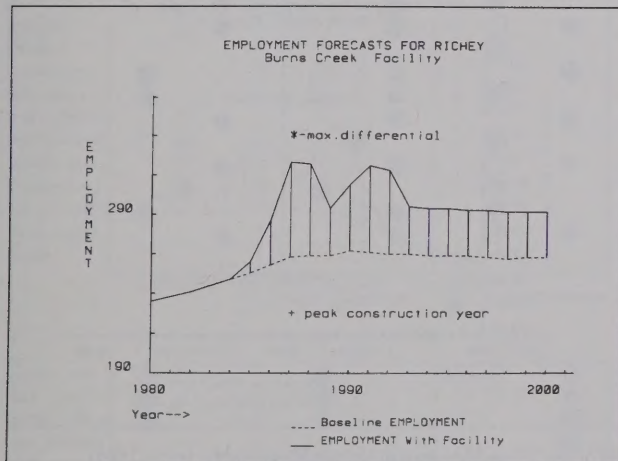
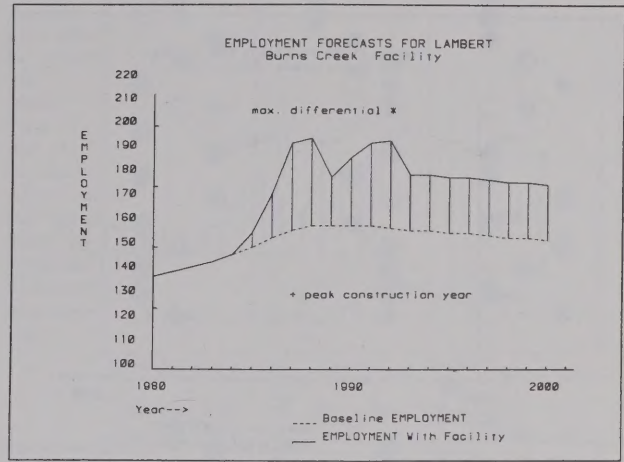
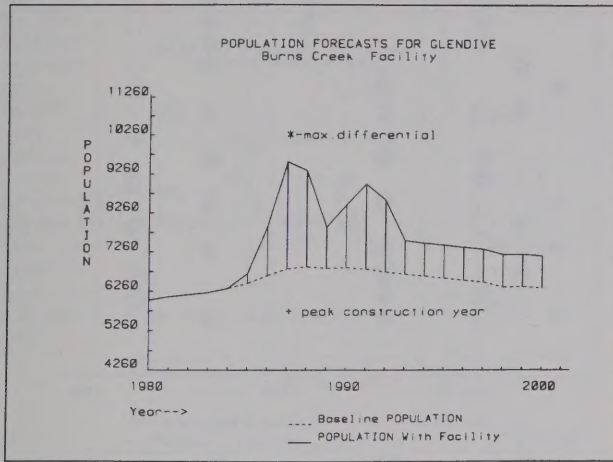
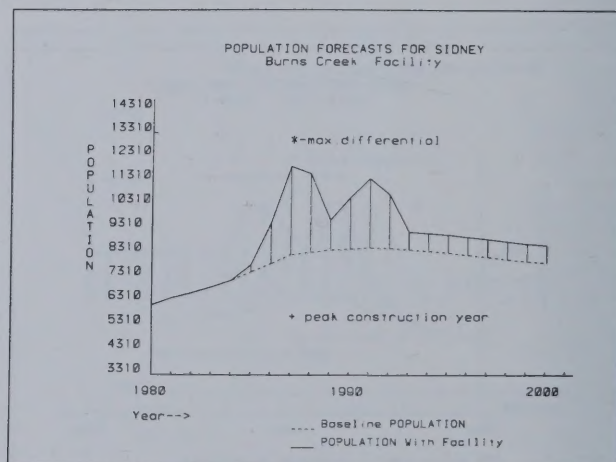
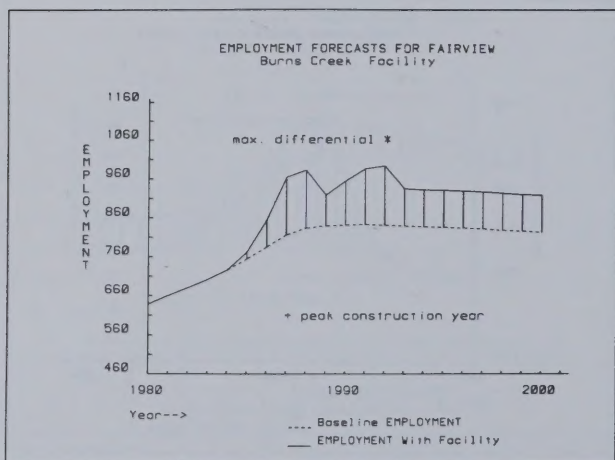
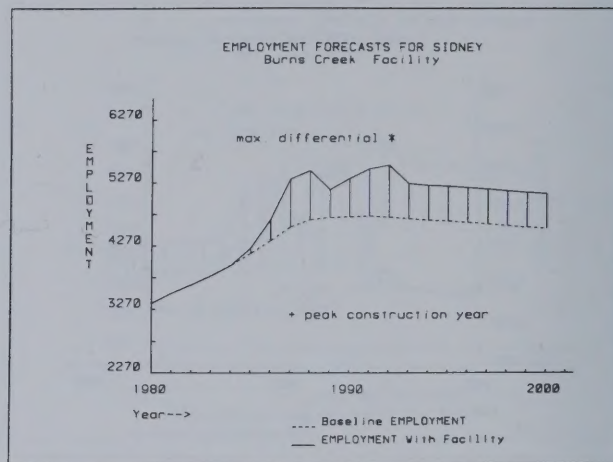
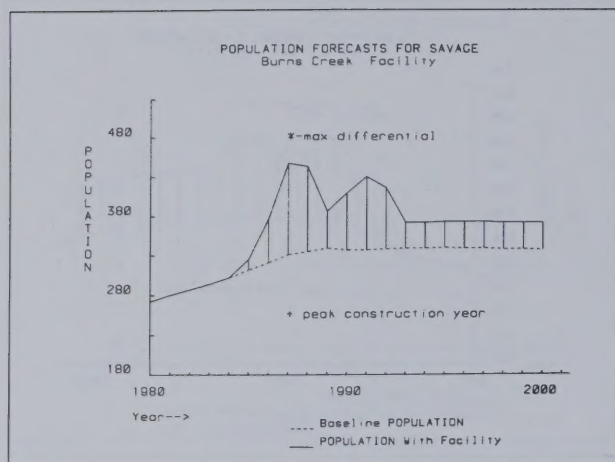
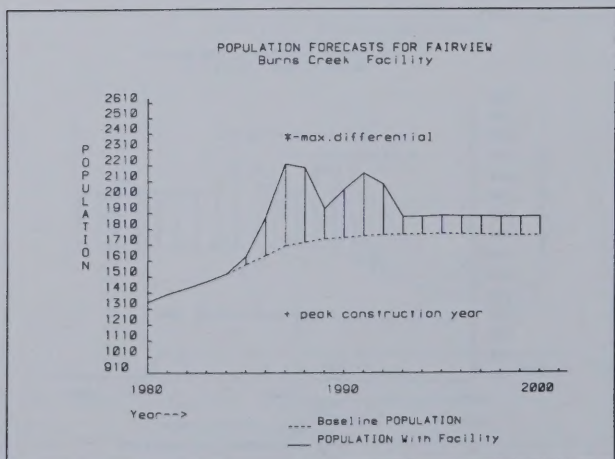


FIGURE 3 (continued)



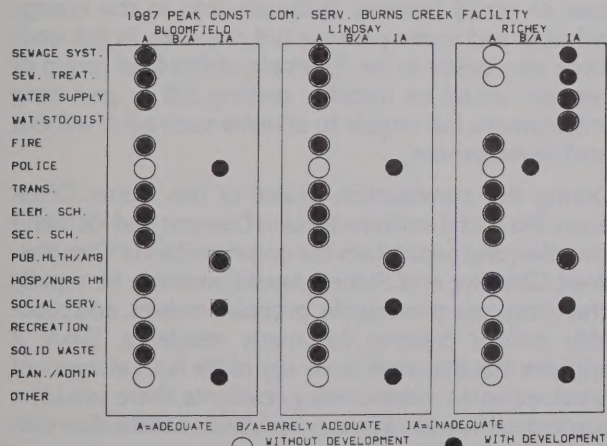
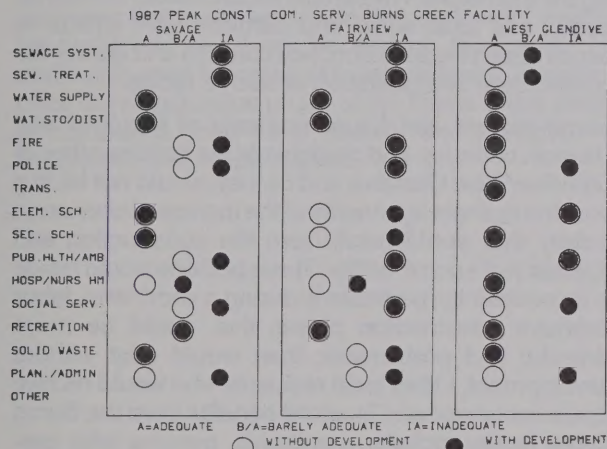
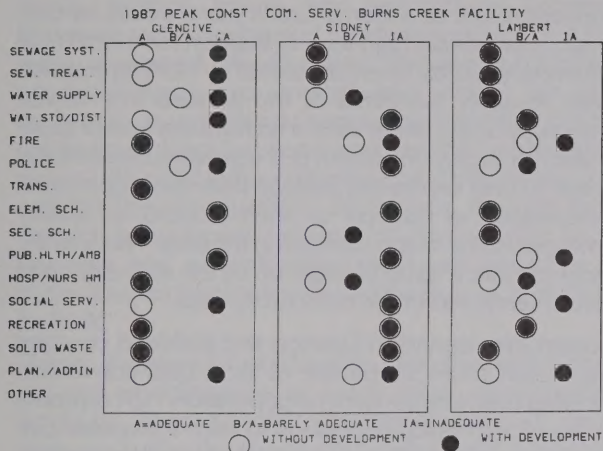
SOURCE: Mountain West Research, Inc., 1981.



casted to boost regional personal income by a maximum of 2.9 percent over baseline values by 1993 as a result of expenditures associated with the construction phase of this facility.

Peak employment during the construction phase is expected to occur in 1987 at 2617 employees with full operations employment expected in 1993 at 900 employees. Using 1987 as the first primary impact date, it is estimated that the communities of Glendive, Sidney, Lambert, Savage, Fairview, West Glendive, Bloomfield, Lindsay, and Richey would experience an inadequate level of one or more community services as a direct result of the 1987 peak construction employment/population levels associated with construction of the facility (Figure 4). Glendive, for example, is forecasted to face inadequate sewage collection and treatment, water supply and distribution, and police services as a result of population growth attributable to the construction of the facility.

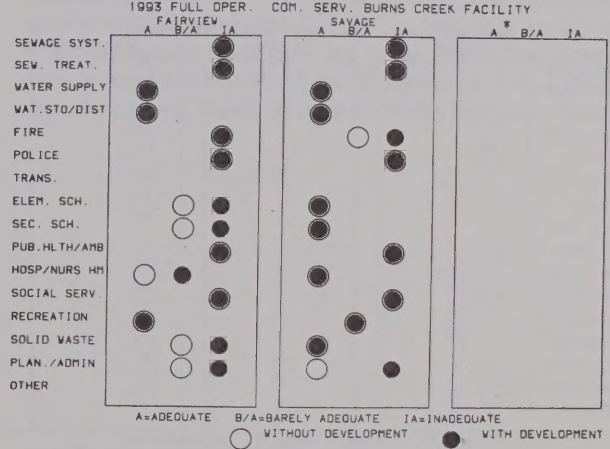
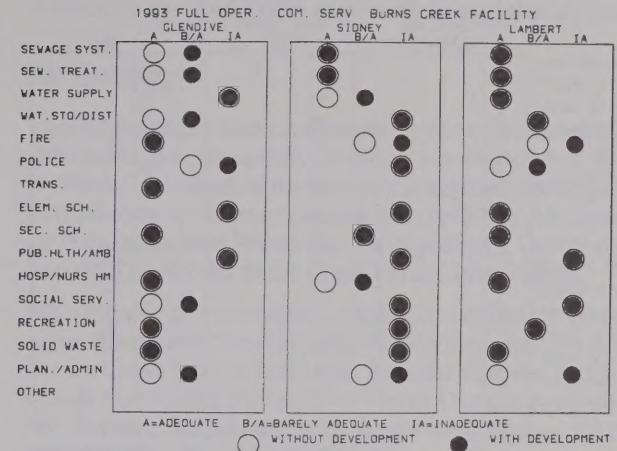
FIGURE 4



SOURCE: Respective city/county or regional planners.

Full operation of the facility (i.e., 1993 and beyond) is also expected to result in impacts on communities services. Figure 5 shows that Glendive, Sidney, Lambert, Savage, and Fairview would experience inadequate services as a direct result of the population influx resulting from facility operation. Additionally, the following communities in the study area are forecasted to face inadequate public services by 1991 even without

FIGURE 5



SOURCE: Respective city/county or regional planners.

tract development: West Glendive, Richey, Lindsay, and Bloomfield. Development of the facility would further worsen an already inadequate service situation in these communities. For comparison purposes, Figure 6 shows the current (1981) public service adequacy assessment in impacted communities.

FIGURE 6

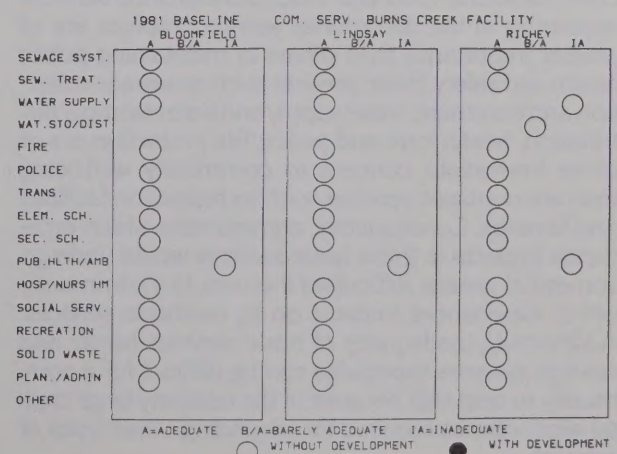
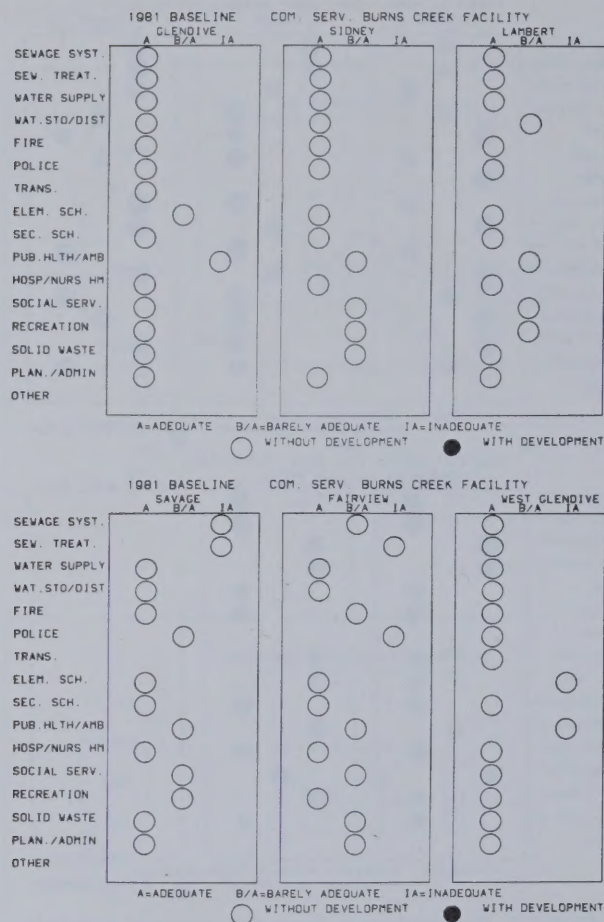


FIGURE 6 (continued)



SOURCE: Respective city/county or regional planners.

The adequacy ratings appearing in Figures 4, 5, and 6 reflect assessments by either city-county or regional planners for the communities involved and constitute the planners' best judgments concerning the fiscal (revenue/cost) situation likely to be encountered by the communities in 1987 and 1993. Several of the services appearing in the community service graphics are of greater importance than others in maintaining public health and safety. Basic services such as sewage collection and treatment, water supply and water storage/distribution, health care and police/fire protection are of more immediate concern to community well-being than are nonbasic services such as recreation facilities and libraries. Consequently, communities which experience impacts to these basic services would undergo somewhat greater difficulties than would a community which experiences impacts on its nonbasic services. Additionally, inadequacy of basic services (water and sewage systems especially) can be difficult for a community to deal with because of the relatively large capital expenditures required for upgrading these types of services.

Residents in Richland and Dawson counties, where the consequences of a Burns Creek plant would be centered, expressed a high level of support for a local coal conversion facility when contacted by BLM representatives. Roughly two-thirds of the persons interviewed were supportive, either with or without any sort of qualification. Roughly one-fourth of the persons tended to be firmer in their expressed position than the proponents. Independent of position on such facilities, air quality emerged as the major concern in the area. This was the most prevalent issue brought up by the sixty-eight persons interviewed in the two county area.

Community leaders in Dawson and Richland counties were even more supportive of local coal conversion facilities than was the general population. No community leader expressed opposition to such a proposal during the interviews. These representatives did identify air quality and local social and administrative effects as issues deserving attention, both prior to and during the construction and operation of such a facility.

Some present and future residents of Richland and Dawson counties, and particularly the communities of Glendive-West Glendive and Sidney, would not be in a position to share in benefits of the increased economic activity that would result from the construction and operation of such a facility. These persons would reside in a community, particularly during a short term, labor intensive construction phase, that would be more stressful and problematic than would exist without development. Other local residents who would receive direct economic and financial benefits from the Burns Creek facility include: merchants, persons who possess or could possess skills required in the energy industry, and some persons not presently in the work force who desire to be. Example of this final group of persons would be females seeking full or part time employment but unable to acquire such a job without coal development.

During the construction phase of the Burns Creek plant, the social environments in Dawson and Richland counties, and particularly the communities of Glendive-West Glendive and Sidney, would probably be rapidly changing, less predictable, probably noisier, and probably anxiety creating for many residents. Since it appears that the small town way of life is an element of great appeal to many existing residents, there would be some deterioration in many resident's satisfaction with their communities. This would be noticeably pronounced during the construction period. During the operation phase, the effected communities would return to conditions very similar to that which would exist without development. The long term changes created by the Burns Creek plant would not be significant.

Dealing with the rapid growth of the construction phase of the Burns Creek facility would be difficult in Richland and Dawson counties. Population growth rates are of

sufficient scale to cause short term disruptions in the family, political, leisure, and occupational systems. However, both Dawson and Richland counties, and the urban centers of Glendive-West Glendive and Sidney, are fairly diverse economically and socially, are relatively large in population (as compared to other potential energy impact locations) and have had some experience with rapid industrialization (primarily oil and gas activity). The communities' experience, through their respective leadership groups, of dealing with such changes and administrative pressures would be a major asset to these areas should the Burns Creek plant be built.

Sidney, Fairview, West Glendive, Glendive, and Richey are not as vulnerable as many other communities would be. Their capacity to manage and absorb rapid changes during the short term is substantial. This does not mean that many service, facility, and social structural problems would not be evident; they would be noticeable, and for residents, very stressful. However, once the construction phase of the Burns Creek plants is completed, long term stability and predictability should become reestablished.

Technical reports are available which describe the methodology used in the economic or social analyses.

Air Quality

The introductory section on assumptions and variables discussed the air quality analysis conducted for the facilities. The result of the analysis is a determination of compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an indirect liquefaction facility sited on the Burns Creek tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NO_x, and SO₂ resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.

LIST OF SOURCES FOR THE PRELIMINARY FACILITY EVALUATION REPORTS

- ITAT Construction Work Force Report for February 1981; Inter-Industry Technical Assistance Team, Basin Electric Power Cooperative, Bismarck, North Dakota.
- Basin Electric Power Cooperative; 1717 East Interstate Avenue, Bismarck, North Dakota 58501.
- The Nokota Company; Suite 112, Provident Life Building, Bismarck, North Dakota 58501.
- The American Natural Resources Company, 1 Woodward Avenue, Detroit, Michigan 48226.
- Final Environmental Impact Statement for the Great Plains Gasification Project, Mercer County, North Dakota. Prepared by the U.S. Department of Energy. August 1980.
- Environmental Assessment of a Coal Gasification Complex in Dunn County, North Dakota. Prepared by the Natural Gas Pipeline Company of America.
- Identification of Synthetic Fuel Impacts: A Preliminary Assessment. Prepared for the Montana Department of Natural Resources and Conservation by teams at the University of Montana and Montana State University. August 1980.
- Montana Energy Almanac. Prepared by the Montana Department of Natural Resources and Conservation. October 1980.
- West-Central North Dakota Regional Environmental Impact Study on Energy Development. Prepared by the U.S. Department of the Interior, Bureau of Land Management and the State of North Dakota. October 1978.
- North Dakota State Department of Health; Bismarck, North Dakota.
- Montana Department of Natural Resources and Conservation; Helena, Montana.
- The Tenneco Coal Gasification Company; P.O. Box 491, Glendive, Montana 59330.

